## AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING WARM AIR HEATING . SHEET METAL CONTRACTING

JANUARY 1941 DIRECTORY NUMBER

TABLISHED 8 8 0



15200 A7

They Meet Every Specification for the Volume Furnace Market

## Cuchinuar

## Automatic Oil Heat & Air Conditioning For Moderate & Low Priced Homes

The Lochinvar line of furnaces is now the largest selling of its kind in the country. Last year's business was a record in the entire history. Lochinvar is THE one heating plant that meets the economic demands of the low-cost home builder for low-priced, trouble-free, dependable winter air conditioning and gravity heat equipment . . . and likewise meets the demands of the low-cost home owner for dependable, economical heating performance. It's the greatest dollar-for-dollar, low-priced heating equipment on the market today.



TWIN-BAFFLE BURNER

The perfection of Lochinyar's performance is due to the exclusive Lochinvar Twin-Baffle Burner, constructed of stainless steel and providing a clean, noiseless, trouble-free operation unequalled for efficiency in any other low-priced type of automatic heating equipment on the market. There are no moving parts in the Lochinvar Multiple-Stage Oil Burner and the design and operation of this burner absolutely eliminates the possibility of the formation of soot or carbon. It is the one and only absolutely dependable, low-priced automatic heating plant yet devised by science to date.

## FOR WINTER AIR CONDITIONING

The Model 100A is a complete winter air conditioning unit. Its B. T. U. output is 125,000, with 1,600 C. F. M. at  $\frac{1}{8}$  inch static pressure.

The Junior-Aire is a complete winter air conditioning unit. Its B. T. U. output is 100,000, with 1,100 C. F. M. at 1/8 inch static pressure.

## The Challengeaire

is a winter air conditioning unit shipped completely assembled with blower, motor, and all controls mounted in position and wired.

#### GRAVITY HEAT

The Model 1/00

Designed especially for Lochinvar's Twin Baffle Barner to give completely automatic oil heat at the lowest possible cost. Constructed of heavy boiler plate steel, all seams welded gas and air tight. An ideal replacement furnace that costs very little more than a coal fired furnace or an oil burner alone.

## 3 HIGHBOY TYPE LOCHENVARS

The Model 80 is a complete winter air conditioning unit with a B.T. U. output of 80,000 and a three-speed direct driven blower. Its C. F. M. capacities are 950, 710 and 575.

The Model 80G This warm air gravity feed model is designed to extract the maximum amount of heat from a minimum amount of fuel. Like model 100 it is built

of heavy boiler plate steel, gas and air tight welded seams. Large radiators give sufficient heating surface and reduce stack temperature.

The Model 60 is a complete winder air conditioning unit with a B. T. U. output of 55,000 and a three-speed direct driven blower.

Its C. F. M. capacities are 850, 640, and 400.

#### GRAVITY HEAT

The Model 60G

is a warm air gravity furnace complete with automatic controls. Its B.T.U. output is 55,000.

## PACE MAKER

14247 TIREMAN AVE. Division of Michigan Tank

FOR 1941

DEARBORN, MICH. and Furnace Corporation

## AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating WITH WHICH ARE MERGED

FURNACES SHIERT METALS

AND

Varm-Air Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 110, No. 1

January, 1941 Founded 1880

— CONTENTS —

1940 Broke All Records		. 8
Arnold Kruckman—Your Taxes For 1941		. 84
National Warm Air Association Convention		16
Bookkeeping—A Plan of Accounts (Part 4)		17

#### RESIDENTIAL AIR CONDITIONING SECTION

Certified Quality—Code for Better Gas Heating	87
Camp Custer—A Defense Housing Project	92
Effects of Insulation, Fan Operation on Filtering	98
Direct Evaporative Cooling For Homes	04
The Six Common Oil Burner Complaints	11
The Technical Code—Precalculated (Part 3)	17
Managing 1,000 Furnace Installations a Year	23
Automatic Controls for Forced Air Heating	29

#### THE SHEET METAL SECTION

Three Contractors Methods on Three Identical Jobs	135
Fabricator Doubles Volume by Advertising	143
Adler Planetarium—A Water-proofing Study	149
Method of Determining Finishing Material Costs	159
The Writing on the Wall	162

## In This Issue

ONE of the country's outstanding efforts to raise standards of design and installation has been quietly under way in Chicago, where The Peoples Gas Light and Coke Co. has instituted Certified Quality—a code for gas furnace design and gas heating installa-tion. The purpose of the code and its salient regulations are reported on page 87.

Of all the rearmament cantonements only one—Camp Custer in Battle Creek, Michigan—seems likely to be completed on sched-ule. This successful completion of ule. This successful completion of a truly gigantic contract—594 forced air furnaces—is due to superlative organization and man-agement. We study the project and outline the methods of Sun-beam Heating and Air Condition-

ing Co., Chicago, on page 92.

One thousand forced warm air heating installations a year requires management of high order. The Columbia Specialty Company's plan of operation and management is related on page 123 by the operations manager. The methods adopted are worthy of study by all large volume operators.

The U.S. Department of Agriculture has just finished three re-gional research laboratories. The three buildings are identical—so are the three air conditioning sys-tems. On page 135 we show and describe the three contractors' fabricating and erecting procedures.

The Adler Planetarium, Chicago, is one of the country's worst ex-posed structures. The building leaked freely so a study was un-dertaken to determine where water entered and the paths of water penetration. The remedies applied are a complete study of water penetration prevention.
What was found and what was
done are shown in numerous
sketches in the article beginning on page 149.

Member of Audit Bureau of Circulations - Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago, Ill., U.S. A. Branch Offices—In New York, Room 1734, Grand Central Terminal Building, Murray Hill 9-8293; In Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191. Copyright 1941 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

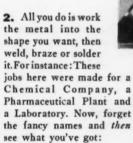
Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, \$2.00; Foreign, \$4.00. Single copies, U.S. and possessions, \$.25. Back numbers, \$.50. January, 1941, Directory issue, \$1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 copies of this issue are being distributed





1. That kid was no worse than my sheet metal friend. Because any sheet metal man that can make a Monel save-all pan for a Paper Mill can make a Monel dye tank for a Textile Mill or a drying tray for a Pharmaceutical Plant.







An' remember: Monel is easy to fabricate. Although it's a strong, tough metal, you don't use up all your profits tryin' to work it an' weld it. Instead, you'll find a job takes less time an' labor made in Monel than lots of other metals.

Yours for the easy-to-work metal that brings in big profits . . .

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N.Y.

# MONGRIEF

Can Supply Just the Right Unit for Every Job

Up and coming dealers find in the complete Moncrief line everything required to build a profitable and substantial business. Moncrief units are correctly engineered, carefully built of quality materials, and all are styled to put them over big with discriminating buyers.

No matter what the homeowner or builder is looking for, the Moncrief dealer can give him the finest package of home heating equipment to be found anywhere for the money.

Other advantages afforded Moncrief Dealers are—Moncrief Special Financing Plan, liberal terms, easy to operate. Moncrief Engineering Service to assist in laying out plans and estimating. Moncrief Sales and Advertising Literature, genuinely helpful in promoting sales.



Get all the particulars of the Moncrief proposition and see how it will help you build bigger and better business in 1941.

## MONCRIEF PIPE and FITTINGS



If you want pipe and fittings that fit—that go together as they are supposed to go, present a neat appearance and give long time satisfactory service, take on Moncrief. Made in two types, specially designed either for gravity or air conditioning. Moncrief Patented Lock Joints make wall stacks, stack heads, foot pieces and trunk duct fittings more efficient, neater and easier to install.

Send for Our Free Big Pipe and Fittings Books







Square Cased
Cast or Steel Furnace

Series S Steel Furnace Series C Cast Furnace

MONCRIEF SUPPLIES EVERYTHING USED ON A WARM AIR HEATING AND AIR CONDITIONING JOB



# Complete Line of Furnaces and Winter Air Conditioners







Aristocrat Oil-Fired Winter Air Conditioner

Utility Oil-Fired
Winter Air Conditioner

Special Oil-Fired
Winter Air Conditioner

Moncrief Gas-Fired
Winter Air Conditioner



DST Stoker-Fired Gravity Furnace



ST Stoker-Fired Winter Air Conditioner



Aristocrat Cast Coal-Fired
Winter Air Conditioner



Aristocrat Steel Coal-Fired
Winter Air Conditioner



Series E Steel Furnace



LongLife Furnace
Cast or Steel



Moncrief Blower-Filter Unit



D-40 Steel Furnace



DeLuxe LongLife
Cast or Steel

THE HENRY FURNACE & FOUNDRY CO.
3473 E. 49th STREET, CLEVELAND, OHIO

## IN ANSWER TO POPULAR DEMAND . .

## GEC Presents

## A NEW FLEXIBLE FIN Gravity Register

- Ready for Shipment in March-

The finest baseboard register ever offered for gravity installations and ideal as a replacement register where an existing gravity job is changed to air conditioning.

Attractive Appearance—thoroughly modern, yet sufficiently conservative to appeal to everyone.

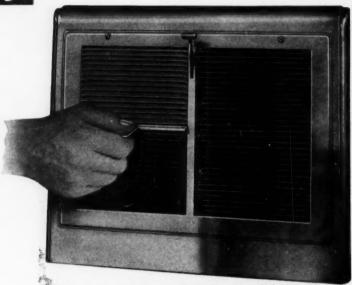
New Metalustre Finish—a rich brown lacquer in excellent good taste. Priced same as Black Japan.

Large Free Area—approximately 80%, which means that size 12 x 8 register can be used on 10" pipe.

Low Resistance, High Efficiency—Tests conclusively prove this register has considerably less resistance than that of the conventional register of this type and therefore higher efficiency—due to the fact that fins are perpendicular to face.

Adjustability—Fins may be adjusted up or down as desired with key furnished.

IMPORTANT—The overall dimensions of No. 130 Series Registers are identical with those of all other Hart & Cooley Gravity Baseboard Registers, making replacement a simple matter.

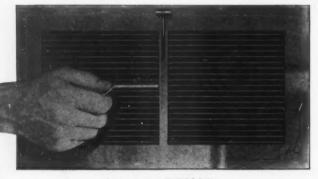


No. 130 SERIES BASEBOARD REGISTER
(Removable Face)

Sidewall Registers and Intakes to Match

## A NEW FLEXIBLE FIN, POPULARLY PRICED

-Ready for Shipment in March-



No. 74 DESIGN

No. 74 Design was developed to meet the demand for a low-priced register providing upward or downward deflection. It is furnished with fins set for 20° downward deflection, and when thus installed in high sidewall locations possibility of streaked ceilings is eliminated. Any deflection desired, however, may be quickly obtained by twisting the fins with the key furnished. Control of the air flow in the horizontal plane naturally makes for better distribution and more uniform temperature—a decided advantage over other low-cost air conditioning registers.

onditionin

Be sure to see these two new lines before placing your stock order—your jobber will have samples February 1

Catalog Reprint Pages on above lines are available for the asking: No. 130 Baseboard Register and Matching Items, Bulletin S 51-52; No. 74 Design Register and Intakes, Bulletin S 66

HART & COOLEY MANUFACTURING CO

Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulley FACTORY AND ENGINEERING SALES OFFICE:

HOLLAND

## Give your customers UNFAILING HUMIDIFICATION



NE small water valve on the evaporating pan holds in its grasp the success or failure of humidification in furnaces old and new! In past years there have been too many cases of these valves plugging up with lime or debris—or sticking open and messing up the basement floor through the overflow pipe. Every time that happened the reputation of some furnace manufacturer or furnace dealer suffered—suffered unfairly, because there just wasn't any better way to handle the matter.

But now it's a different story. All of our experience in building water level controls has been brought to bear on this one small valve. The result is something as different as it's better. Unlike former humidifier valves the new McDonnell Humidifier Valve has no slightly cracked position—no position in which it merely seeps or dribbles. When the water level falls a quarter-inch in the evaporating pan, it snaps wide open—flushes its seat clean with a full stream. That's why it doesn't plug up. It closes with the same snap—absolutely leak-tight against city water pressure clear up to 150 lbs.

The better job it does has not wanted for recognition. It will be standard equipment on a number of the best furnaces in 1941, and dealers who have installed it during the past year call it the final answer to the humidifier problem.

Ask for Complete Particulars or an Operating Sample.

MCDONNELL & MILLER, 1318 Wrigley Bldg., Chicago, Ill.

#### INSTALLED ON ANY FURNACE —

A typical application is shown above. The valve is available as:

No. 217 Complete, with copper tubing and fittings as shown below.

No. 117 Same as No. 217, but without tubing and fittings.

No. 17 Valve and float only (without float chamber).

It is finely built throughout—valve machined from bar stock; all-but-indestructible special alloy seat; adjustable float level; finely made parts. But, thanks to elaborate tooling, it is moderately priced!



# cost of New Home \$8,000. and 75 cents.

## The 75¢ paid for permanent rust resistance in the duct work

YES, that's all it costs in the average 6-room house—75 cents more to build the duct work of U·S·S Galvanized Copper Steel. The price of a dinner or a taxi ride will buy steel that has 2 to 3 times the rust resistance of plain steel! Then you can be sure your jobs will not rust-out because of high humidities, condensation or smoky air.

Many heating contractors and furnace builders are using U·S·S Copper Steel as an added sales feature. Building owners are quick to see the necessity of greater rust resistance for humidified air heating systems.

Look at the corrosion chart in this advertisement. Twenty-one years of painstaking tests have definitely established the superiority of U·S·S Copper Steel.

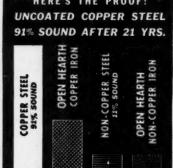
In the shop, U·S·S Galvanized Copper Steel has other advantages. It is soft and ductile, can be fabricated quickly. Sharp turns and intricate shapes are easy to make. Spoilage is reduced. This means actual dollars and cents savings.

The cost of U·S·S Copper Steel is so low and its added advantages so important that it deserves serious consideration for every air conditioning job. We'll gladly show you how others are using copper steel—just write.





FURNACE AND DUCT WORK both are built with  $U \cdot S \cdot S$  Copper Steel. This insures complete protection against rust throughout the heating system.



This chart compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of tests carried on at Annapolis, Midleon 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated).



## GALVANIZED COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago COLUMBIA STEEL COMPANY, San Francisco TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors
United States Steel Export Company, New York

## UNITED STATES STEEL

A UNIT TO FIT EVERY NEED











WE ARE 75 YEARS OLD IN '41

#### O DEFEND YOUR DUSDIESS

against unsatisfactory performance of the jobs you install by using the time-tested pipe that has been the "yard-stick" of warm-air pipe performance and value since 1896.

"Out in front" then—it is still leading TODAY, and our big ner plant is like a bee-hive, producing "regular" HANDY pipe and the latest developments in DUCI WORK for forced air and air conditioning jobs.

MAKE A PROFITON ALL JOBS

With

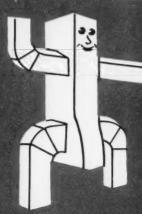
MAAN DON

Furnace-pipe

and Duct-wo

The HANDY CATAIRE

what' in pipe — if you haven't a copy of No. 51 (black and orange) ask for the contract of the



F. MEYER & BRO. CO. PEORIA. ILLINOIS F. MEYER 8 BRO. CO. Peoria, III.

Please send your Catalog No. 52 and discount sheet.



# We SALUTE THEM

The people pictured here.

Today they look amusing — even as pictures of us, today, will look fifty years from now!

But they were "The salt of the earth"— the foundation of what is now America— the "rugged individuals" who crossed mountains and valleys and broke the prairie sod to give us today's cities, villages and farms.

They were great and hardy folk — or we might not be here today!

We salute them!

## M. H. B. B. B. H. H. H.

In 1880—"Before Weir"— heating equipment looked like the old "pot-bellied" stove above — and "air-conditioning" was limited to the simple process of heating it — and a pretty poor job of heating at that!

It was in 1882 that the WEIR furnace made its bow — and the basic idea of home comfort in ALL the rooms began to take definite shape. But for a long time thereafter only the very wealthy could afford the luxury of all-warm homes.

In the years that have followed, the WEIR furnace has led in the development of warmair heating — both in efficiency and economy — and today the WEIR-MEYER lines of heating and air-conditioning equipment lead as distinctly as ever — if not more so — annually proving THE BEST PROFIT-MAKERS FOR DEALERS IN THE INDUSTRY.

25-year dealerships are common. If you are tired of "switching" around — if you would like to make a from-here-on-out connection with a line that is COMPLETE and on which you have the EXCLUSIVE, then you should lose no time in getting lined up with WEIR-MEYER "for '41 and ever-after."



## and Here's ur Salute to Business in 1941..

By common consent, 1941 will find us in the midst of business prosperity.

Authorities agree that the billions being poured into National Defense will speed employment and private incomes to where the desires for new homes and new heating and air-conditioning equipment in present homes can be gratified on a scale heretofore unprecedented.

## THIS PUTS WEIR-MEYER DEALERS "IN CLOVER"

With a COMPLETE line for coal, oil and gas . . . With an EXCLUSIVE (and protected) territory . . . With the Weir-Meyer NAME . . . With Weir-Meyer ENGINEERING . . . With Weir-Meyer SALES HELPS (that really help, including low-rate, non-recourse financing) . . . and with Weir-Meyer STABILITY . . .

#### A WEIR-MEYER DEALERSHIP IS SURE TO BE A "PROFITSHIP"

The FIRST thing to do is to START... and, to start, all you need to do is to mail the coupon in the corner. It carries no obligation — but it DOES open the door to the best year you've ever known — and the beginning of a reationship of no regrets.

Large size, high-output furnaces of the Weir-Meyer line meet the present-day requirements of the National Defense Housing.

## For Every Fuel - For Any Pocketbook.



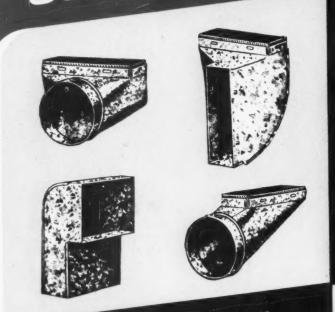


Manufacturers of WEIR AND MEYER STEEL FURNACES
& AIR CONDITIONING APPLIANCES . . Established 1866

THE MEYER FURNACE COMPANY

Please send details of the WEIR-MEYER EXCLUSIVE dealership.

# 



We recall the days when "eaves-trough" and "down-spouts" were made in every shop — but that was before men learned the true economy (and profit-assurance) of buying from "pipe specialists."

Some shops are still making their own ductwork — but those who best know their costs are using HANDY properly designed and proportioned duct-work. It, too, is the and proportioned duct-work and insures product of "pipe-specialists"— and insures performance— plus profits.

## We're "At Home"

Our fire, last May, truly had "a silver lining" in that it was responsible for our moving to this larger and better home. Today we are working overtime "catching up" on a reserve stock and filling immediate orders.

We sincerely thank all those who were so patient while we were unable to fill their requirements. 1941 looks like the biggest year HANDY pipe has ever known!



## MOREPRO

WITH "HANDY" PIPE.

New Home Construction in 1941 promises to break all record Are YOU preparing to profit from this building him?





F. MEYER & BRO. CO.
PEORIA, ILLINOIS



## **HOW TO CONTROL DRAINAGE IN MASONRY WALLS!**

Use of Anaconda Through-Wall Flashing prevents interior damage due to seepage and helps to avoid salt deposit streaking

Because seepage is common in masonry walls, adequate drainage must be provided to prevent streaking of outside walls and damage to interiors.

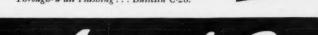
Anaconda Through-Wall Flashing offers the easiest, least expensive and most positive method of drainage control. So designed as to drain itself dry on a level bed, this copper flashing also prevents lateral movement in any direction.

It is constructed of 16 oz. Anaconda Copper and is

available in 8' lengths in a range of standard and special widths with various selvages. More about these and other interesting details is contained in Bulletin C-28. Ask for a copy.

**33** 

Fully illustrated 12-page folder on Anaconda Through-Wall Flashing... Bulletin C-28.



CHRACONDA COpper

THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Conn.

In Canada: Anaconda American Brass Ltd., New Toronto, Ont. Subsidiary of Anaconda Copper Mining Company

#### Reminder to Contractors

On most residential jobs, and on much commercial work, there is an opportunity for you to sell sheet copper for hoods and canopies over dormers, entrances and display windows. There's no harm in trying!



with 1941'S

PRESENTING

Pro

tha

size

star

Dar

U.

re

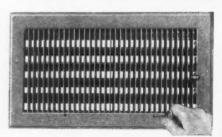
CO

The NEW

AIR CONDITIONING DESIGNS

FOR EVERY PRICE JOB!

#### 4-WAY FLOW ADJUSTABLE BAR



(Full-Face Coverage—Low Resistance Line)

The No. 249 Series is the peak of perfection in Multi-Louver Adjustable-Bar Registers—no puzzling features to develop trouble, no "trick" untried gadgets. It gives instantaneous regulation of any angle Up Flow to 45° Down Flow with the Side-Lever smooth operating Back-Blades. It gives

ing Back-Blades. It gives any desired Side Flow to 45° by simply setting the vertical (key-pin operated) Adjustable Grille Bars.

## 4-WAY FLOW FLEX-BAR

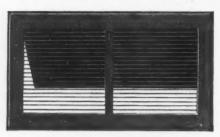
(Full-Face Coverage—Low Resistance Line)

Wide variability of setting air flows at the time of installation is possible with the Style 256 series. Multiple valves give you any degree of Up or Down Flow. Direction of Side Flow is accomplished by using a handy setting wrench on the Flex-Bars of the Grille. Unlike some registers of this



like some registers of this type, the U.S. Flex-Bar is durably constructed so that any required number of grille-bar settings may be made without damaging the register.

## U. S. LOUVER-TYPE A-C REGISTERS



Made of the same superior class of materials and workmanship as the adjustable designs, Style 153 U. S. Louver-Type Registers, with or without Inset Panels, are ideal for the openings where airflow adjustment is not required. They give you real quality at low cost—a way to make distinctive installations and still keep

within competitive figures. Up Flow and Down Flow Deflection may be had on 153 Style by setting of Grille Bars with Setting Wrench.

## PERFORATED A-C REGISTERS

Whenever you run into a competitive situation where price is the determining factor, you can still give your customer an exceptional buy by installing the neat NEW U. S. Perforated Registers. Style 103 is the sidewall type, Style 109 for baseboard installation. These are all non-directional registers — the best of their type on the market. Made in Horizonta.



market. Made in Horizontal Slot-Lattice Design.

#### New METALAC Finish

A New Dark Brownish Shade of Lacquered Antique Brass that takes a Black Japan List. A pleasing contrast in some cases. A pleasing blend in other cases. May be used as a Prime Coat for Darker Coatings but is not advisable for White or real Light Finishes.

## UNITED STATES

BATTLE CREEK

MICHIGAN

★ BRANCH WAREHOUSES AT

## Outstanding Register Line!

## 40 SERIES Baseboard Register

In development for months . . . tested by University laboratories . . . now in production . . . U. S. is ready for immediate delivery of this unusual new baseboard register. It's a Leak-Proof register with detachable frame, offering less resistance (for equal or greater capacity) than the usual conversion-type register. Costs less to install than a one piece register. Helps you convert Gravity installations to Modernized Air-Conditioning Systems without changing sizes of original installations—Eliminating patching of walls and redecorating. Made in all standard baseboard sizes. Up or Down Flow settings can be made with handy wrench. Damper opens to full 90°. It's a real profit-maker for you.

COMPLETE GRAVITY
REQUIREMENTS



On top in "popularity polls" of Bar-Type Registers from coast to coast is the famous U. S. Panama Design. It's the neatest design in the vertical-bar type. Spacing of Pinched-Bars gives the maximum capacity, yet creates no objectionable gaping appearance. Smooth round corners and removable centers with Turn-Lug Fastener have made the Panama preferred in every type of home.



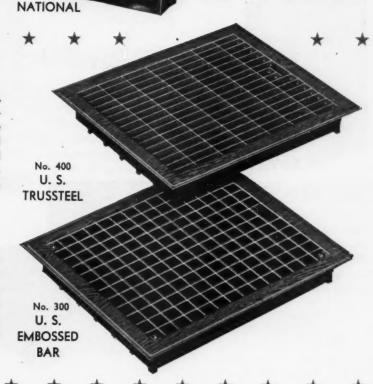
Hundreds of thousands of installations have proven the value of this ever-popular Diamond Lattice Design. NATIONAL is a national tradition of over two decades—the original leak-proof Gravity Baseboard Register. Features include smooth round corners, removable centers with Turn-Lug Fastener, and no loose screws.

## U. S. TRUSSTEEL

Heating contractors everywhere agree that the U. S. No. 400 Trussteel Registers set a new high standard in assembled-and-welded-bar-construction Floor Registers. It has 82% free area and heel proof spacing. Its patented bar suspension and perfect seamless corners are unequalled. The beautiful natural wood grain is photographically reproduced. All other standard finishes are available. No. 405 Trussteel Faces have no Competitive Equal.

## U. S. EMBOSSED

The U. S. No. 300 Steel Embossed Floor Register is known throughout the industry as the "world's strongest embossed bar register." The rounded bars are strongly reinforced and a combination of the Precision of U. S. Die-Work and Finest Press Equipment and Finishing Facilities, make this a serviceable register of real beauty for all types of openings. No. 305 Steel Cold air faces to match.



## REGISTER COMPANY

MINNEAPOLIS \* KANSASCITY \* ALBANY

SAN FRANCISCO \* NEW YORK CITY

SEND FOR NEW 1941 CATALOG

## COMFORTZONE OFFERS

Round Cased Gravity.

Low in cost.

Sizes-20, 22, 24, 27.

Head and pouch cap welded inside and

Heavy, center dump duplex grates.

Extra heating surface.

#### 600 SERIES

Round Cased Gravity.

A quality product yet low in price. Made in six sizes, 20" to 34".

Sizes 20" to 27" have cast or steel fronts.

Riveted and welded body and radiator.

Double smoke outlet.



#### 3300 SERIES

Square Cased Air Conditioner. Made in 4 sizes, 20" to 27".

300 series drum and square radiator.

Steel front.

Smooth green finish.

#### 6600 SERIES

Square Cased Air Conditioner.

Made in six sizes.

Same drum and radiator as 600 series.

Beautiful smooth green finish.

Cast front.

All refinements.

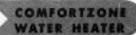
A truly fine furnace.



The stoker clinker pan model is different than the regular 3300 or 6600 series equipped for stoker firing in that the front extends 2" further out and provision is made for clinker pan within the furnace casing.



The Comfortzone burners are furnished in a variety of combinations. Four air delivery combinations are utilized to insure maximum combustion efficiency of the burner throughout its range from .6 to 6.0 gallons



The Comfortzone water heater is designed to give fast recovery, namely, 90 gallons per hour at an 80° rise in temperature of water from inlet to outlet. The tank is galvanized with fire tube construction and has 30 gallons storage ca-



Pipeless.

Body same as 300.

Made in four sizes, 20" to 27"

Extra heating surface.

Register-standard equipment.

Clinker resisting brick.

Heavy grates.



All coal fired jobs suitable for stoker firing.

Chute provided on either side and arates omitted.

Firebrick furnished as standard with stoker model.

Stoker chute can be furnished on 3300 and 6600 series.



#### 3200 SERIES

Square Cased Gravity. Same body as 300 series. Radiator square for better distribution of air inside casing. Water pan located in casing. Beautiful green smooth finish.







## YOU A WIDER CHOICE



GAS

#### G SERIES

Gas Fired Air Conditioner.

Made in sizes to meet small home requirements.

Package units (completely assembled ready to set in basement).

Smooth green finish.



#### C SERIES

Air Conditioner.

Made in sizes 75, 100, 125, 150, and 190, thousand B. T. U. at register.

With or without burner.

Heavy steel in drum and radiator.

Smooth green finish.



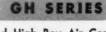
Air Conditioner. 85000 B. T. U. at register. Designed for small homes.

With or without burner.

Next larger size, the M100, is similar in appearance to C series shown above.

Smooth green finish.

M SERIES



A Gas Fired High Boy Air Conditioner Utility Room Heater.

Complete with burner, blower, and all controls.

Smooth green finish.



#### GR 930

A Gas Fired Gravity Furnace. Input 110,000 B. T. U. 455 sq. inch Leader Pipe. Square cased in smooth green finish.



#### MGR 100

An Oil Fired Gravity Unit.

Designed strictly for oil.

Beautiful square casing finished in smooth green.

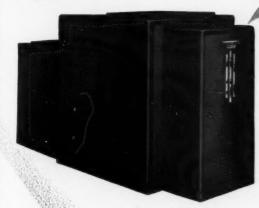


Air Conditioning Unit.

Made in sizes from 250 to 500,
thousand B. T. U. at register.

Suitable for factory, school, church, or other large installations.

Oil burning. Efficient. Smooth green finish.



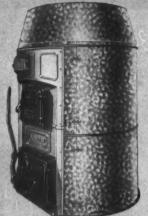
Comfortzone

MICHIGAN TANK & FURNACE CORP.

MINI DRAIDLE AVE DETROIT MICH

A name that indicates a high standard of value. A Company with advanced engineering and manufacturing facilities.

## RYBOLT



SERIES 15 — Cast Iron, Coal-Fired Gravity Furnace



SERIES 4000 —Steel, Coal-Fired Gravity Furnace



SERIES 600 — Steel, Coal-Fired Gravity Furnace



SERIES 4000—Square Cased, Steel, Coal-Fired Gravity Furnace



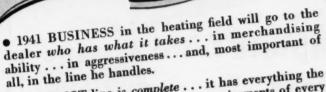
SERIES 157 — Cast Iron, Coal-Fired Winter Air Conditioner



SERIES 600A7
Steel, Coal-Fired
Winter Air Conditioner

## RYBOLT EVERY

HEATING NEED



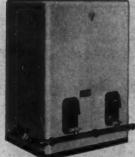
The RYBOLT line is complete . . . it has everything the dealer needs to meet the heating requirements of every customer . . . whether he lives in a mansion or a cottage . . . whether he has much or little to spend. For automatic heating the customer has his choice of an interesting wariety of RYBOLT Winter Air Conditioners. For the smaller house and lighter purse there are the RYBOLT smaller house and lighter purse there are the RYBOLT Gravity Furnaces . . . which represent the culmination of a quarter century of fine furnace building.

RYBOLT heating units come in cast iron or steel... fired by coal, gas or oil. They, too, have what it takes to meet today's exacting demands for utmost efficiency, comfort, convenience and economy. Write for interesting folders.

THE RYBOLT HEATER COMPANY
615 MILLER STREET . ASHLAND, OHIO



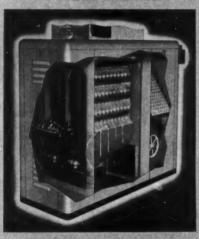
RYBOLT Oil Burner



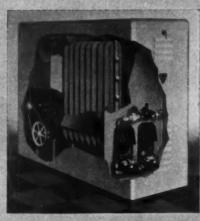
SERIES CCC Cast Iron, Gas-Fired Gravity Furnace



SERIES 4200 — Steel, Coal-Fired Winter Air Conditioner



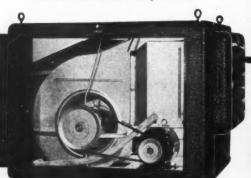
GAS MASTER - Steel, Gas-Fired Winter Air Conditioner

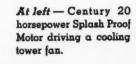


SERIES CG — Cast Iron, Gas-Fired Winter Air Conditioner



GAS MASTER Steel, Gas-Fired Gravity Furnace Below—Century Split Phase Cushion Mounted Motor driving a blower.





Below — Century one horsepower Repulsion Start Induction Motor driving a blower on a room cooler.



Offers You a Complete Line of Electric Motors

for better
air conditioning and
refrigeration
performance



Century Cushion Base Capacitor Motor.

The right motor is an important part of your sales and manufacturing program. For you can't promise to deliver the most effective, economical performance from your installations unless they are equipped with the correct motor drive.

There are Century Motors to accurately meet the starting, accelerating and operating demands of the various parts of all air conditioning installations — meeting these requirements smoothly, quietly and efficiently. They are available in the widest variety of types and sizes,

from fractional to 600 horsepower.

Look to the Century complete line of electric motors to aid you in obtaining top performance from every type of installation—motors that meet the specialized demands of blowers and fans, pumps, refrigeration compressors, unit heaters and coolers, etc.

31 Century Branch offices want to serve you. Permit your Century Motor Specialist to consult with you about your motor problems.

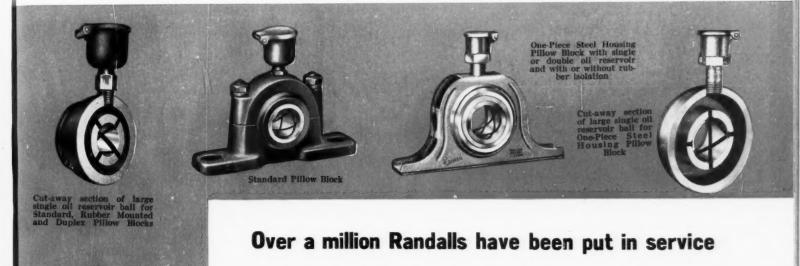
#### **CENTURY ELECTRIC COMPANY**

1806 Pine Street St. Louis, Mo. Offices and Stock Points in Principal Cities.



One of the Largest Exclusive Motor Manufacturers in the World

# Randall invites you to use these PILLOW BLOCKS in '41



The long, trouble-free, quiet operation of Randall Pillow Blocks is the reason most manufacturers of air conditioning and warm air furnace equipment will specify them again in 1941.

During the last year the new One-Piece Steel Housing Pillow Block has been adopted by so many manufacturers as standard equipment that it is now the most popular and the largest production pillow block in the line. Available for shaft sizes up to 1-5/16", it is lighter in weight, easy to assemble and low in cost.

Over a million Randall Pillow Blocks in use is evidence of their continuous satisfactory service. Manufacturers specify them, knowing that their units will be free from bearing failures and metallic bearing noise in field operation.

If you are handling or installing air conditioning or warm air furnace blowers, be sure to specify quiet Randall bearings. They are self-lubricating and self-aligning. They operate with a minimum of attention. They are bæcked by Randall's more than a third of a century of bearing engineering.

The new Randall 1941 catalog gives complete details, specifications and illustrations of pillow blocks for every requirement. Write for your free copy. If you are interested in telling us about your bearing problems, our engineers will submit recommendations without any obligation.

## RANDALL GRAPHITE PRODUCTS CORPORATION

609 West Lake Street

Dept. 111

Chicago, Illinois



Rubber Mounted Pillow

Flange Pillow Block



Universal Pillow Block



D. R. O. R. Pillow Block



# FOR ALL HEATING UNITS

IN STOCK FOR IMMEDIATE SHIPMENT
GUARANTEED TO FIT

ALSO A COMPLETE STOCK OF

ASBESTOS PAPER & CEMENTS
BLOWERS & CONTROLS
DRAFT REGULATORS
FIBERGLAS INSULATION
FILTERS—DUSTOP
FITTINGS & SUPPLIES
FURNACE CLEANERS
HUMIDIFIERS
REGISTERS
TANK HEATERS

IN FACT WE CARRY EVERYTHING TO ENABLE YOU TO MAKE A 108 COMPLETE

ORDER ALL FROM

A. G. BRAUER SUPPLY CO. 2100 Washington Ave., St. Louis, Mo.



For twenty-five years this company has been one of the regular sources of supply of the United States Government for hand tools.

When the Defense Program started, we naturally were expected to assume our proportion of deliveries.

While Government requirements are only a relatively small percentage of our output, the rapid development of the Defense Program and the quick delivery required temporarily upset production schedules for our regular customers.

Every effort is being made to correct this and we ask your indulgence until such a time as we can give you the service to which you are entitled.

CRESCENT TOOL COMPANY

JAMESTOWN, N. Y.

## CRESCENT and Smith & TOOLS

# For the utmost in heating satisfaction, in heating satisfaction, acceptance, and profits acceptance, and profits



You may have all the furnace business you can handle, this season. But—how much money will you make? And how much will this year's jobs add to your reputation as "the man

to see" about furnaces in your city—next year and for years after? To make real money while business is rushing, you need a bigger share of the *good* jobs. That means you need Mueller's complete line — with its wide range of gravity and winter air conditioning units — its full choice of sizes

and types, and its extra competitive talking points for the moderate-priced jobs.

A good reputation may be worth more to you than money in the bank, some day when competition gets really tough. Add the Mueller name and Mueller performance to your own skill as a craftsman, and you have what it takes to build a reputation.

Mueller gives you everything you need—even including Mueller Pre-Fab fittings with the Mueller patented take-off — from one source, with one well-known name.

Each furnace is engineered for one particular fuel — so your customers get real fuel economy . . . and you get the right furnace, at the right price, to give satisfaction on *every* job — and build your reputation as the leading furnace installer in your locality.

And Mueller's handsome designs give you jobs you can be proud of—jobs that make more jobs when visitors see them . . . Make 1941 a year of success and progress for your business, by "going Mueller" all the way. Mueller has nation-wide distribution. If you're not acquainted with the Mueller distributor in your territory, write us. Literature and complete information also furnished on request . . . L. J. MUELLER FURNACE COMPANY, 2010 West Oklahoma Avenue, Milwaukee, Wisconsin.

## With MUELLER, you sell them all

- √ big jobs, little jobs
- I new jobs, replacement jobs
- I the extra-profit automatic jobs
- √ the extra-profit air conditioning jobs

  (or both combined)
- √ and extra-satisfactory "plain furnace" jobs
- √ for all 3 fuels (coal, oil, gas)

\*Furnaces indicated below available with "Levelizer"—exclusive with Mueller—regulates gas flame up and down — not "on and off". Mueller will soon announce three new popularly priced units for the small home market. (1) A vertical cast iron gas-fired furnace (2) A vertical vaporizing oil-fired furnace (3) A steel gas-fired gravity furnace. Watch for these announcements.



\*SERIES EPS Gas-fired Winter Air Conditioning Furnace. Thrity comfort for the larger home—and a simple installation for you. MUELLER Gas-fired Unit Heaters. Open up a new, profitable field for you, in space heating for factories, warehouses, hangars, shops.

\*SERIES SHP Gas-fired Winter Air Conditioning Furnace. For small homes. Provides "luxury heat" at low cost. GAS ERA BOILERS — For steam, hot water or vapor. In three styles. Sizes for any residential, commercial or industrial need. SERIES 50 Oil-fired Winter Air Conditioning Furnace. "De luxe economy" in a simplified "package" unit. In three sizes.

## across the board in 1941





## Easier to sell because of Mueller's consistent national advertising

... in magazines read, according to a recent survey, by over 90% of families planning a new home. Add the prestige of the Mueller name to your own local standing, for a winning combination.

NEW SERIES FB Coal-fired Winter Air Conditioning Furnace. Much of the compactness and fine appearance of Mueller's gas and oil equipment have been engineered into this "package" unit, to give it new sales "oomph". Here is a sensational leader to boost your 1941 profits, and give your customers performance they never stop talking about.

MUELLER Milwankee

HEATING AND AIR CONDITIONING



SERIES 400 Steel Furnace with Winter Air Conditioning. Modern styling, dependable, economical performance. Also available in gravity styles.

SERIES 200 Steel Furnace with round casing for gravity operation. Available also as a "package unit." SERIES AP Double Radiator Furnace with Winter Air Conditioning. Extra capacity that means quicker response, steadier heat and fuel saving. SERIES SA Stoker-fired Furnace with Winter Air Conditioning. Extra capacity, no fly ash accumulation, integral clinker chute. SERIES FE "Eterno Furnace". Guaranteed for 20 years . . . gives a lifetime of service and an extra selling value that increases profits.

## Have You Written For YOUR MONMOUTH CAPACITY INDICATOR?



## MAKES YOU AN EXPERT OVERNIGHT!

This handy little calculator tells you accurately and instantly how much humidification is required for any job. Easy to use and easy to understand. Your work requires that you **know** how much water-surface or equivalent evaporation is needed for proper humidification of a given home. Now—for the first time—you **can** know, and all it costs you is the postage stamp that brings us your request. Don't delay. Write us today.

## This Scientific Calculator Sent FREE to Heating Men

Every mail brings us floods of requests and bouquets for the Monmouth Speedy Capacity Finder. One dealer writes: "For the first time since I've been in this business I know what I'm doing when I put in a humidifier. Your capacity finder reduces humidification to a simple science that even my salesmen can understand. And for the first time I can show the customer just how much capacity his present humidifier has and how much his house actually needs."

You, too, can stop guessing at humidification. Just write us today and your capacity indicator will be sent absolutely free of charge. Years of engineering and research are wrapped up in this simple little pocket-size scientific instrument. Although it helps sell Monmouth Humidification Systems, it also helps sell **all** systems. It is Monmouth's contribution to air conditioning and has rightly been called—"The most important sales tool ever developed for humidification."

If you have not yet written for your Indicator, may we suggest that you do so today? Write on your business letterhead and your request will be filled promptly. There is absolutely no cost to you.

MONMOUTH PRODUCTS CO.

1933 East 61st Street Cleveland, Ohio

# MONMOUTH The Greatest Name in Humidification

THE PLEASE LINE OF COMBINATION LIMIT CONTROLS
AND Fan Witches



## Greater SIMPLICITY

Only One Thermal Element
Fingertip Adjustment – Easy to Set
All Settings Visible at a Glance
Convenient Manual Fan Switch
Surface or Flange Mounting
Simplified Wiring
All Models same Shape and Size

## Greater ACCURACY

Responds Quickly to Temperature Changes Simple Switch Linkage — No Friction Drives Operates in Any Position

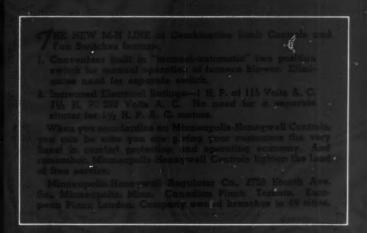
## Greater DEPENDABILITY

Cannot be set out of Proper Sequence Employs the M-H Con-Tac-Tor Snapswitch Each Switch can Function Independently Compensating Adjustment Permits use of Any Convenient Location

## Greater PROTECTION

Lock-on Cover (optional) Bi-metal Helix is Guarded All Working Parts Protected

# IMPROVED MODELS TO MEET EVERY NEED



MINNEAPOLIS-HONEYWELL

CONTROL Systems

# COPPER NEEDS!

prompt answers

PHILADEL PHIA WAREHOUSE
1632 FAIRMOUNT AVENUE
PHILADEL PHIA AVENUE
Telephone FREemont 5037

ST. LOUIS WAREHOUSE

1620 DELMAR BOULEVARD

Telephone CEntral 9192

CINCINNATI WAREHOUSE

CINCINNATI, O.

Telephone MAin 2833

SEVEN COMPLETELY EQUIPPED

SEVEN PROMPT SOURCES

WAREHOUSES

HUSSEY
COPPER and BRASS

NEW YORK WAREHOUSE 140 SIXTH AVENUE NEW YORK, N. Y. Telephone CAnal 66326

CHICAGO WAREHOUSE

212 S. JEFFERSON STREET

CHICAGO, ILL.

Telephone HAYmarket 5607

CLEVELAND WAREHOUSE

S318 ST. CLAIR STREET

CLEVELAND, O.

Telephone HEnderson 7695

PITTSBURGH WAREHOUSE & ROLLING MILLS 2850 SECOND AVENUE, PITTSBURGH, PA. Telephone GRant 3650

Yes, name your copper needs—your Hussey Warehouse carries every copper item you use in stock ready to be rushed to you with time and money-saving speed. Since they can serve ALL your copper needs, why not standardize on Hussey Copper? Try

the convenience of ONE order—ONE billing—and ONE friendly dependable service. Choose the Hussey Warehouse nearest you and try this valuable convenience. You'll save time and money and have a dependable supply for every copper need.

C. G. HUSSEY & COMPANY

(Division of Copper Range Company)

ROLLING MILLS AND GENERAL OFFICES: PITTSBURGH, PA.

# Asbestos Protected DUX-SULATION

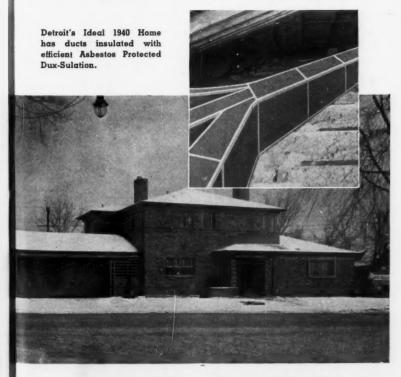
SOUND ABSORBING AND INSULATING, HEATING, VENTILATING AND AIR CONDITIONING DUCTS

## Insulates Better

Absorbs 70% of noises ... 75% Thermal Insulating Efficiency (K Factor .27 BTU) ... Prevents Condensation, (Sweating or rusting ducts) ... Low Frictional Resistance, (.f 0.0001322) for free air flow ... Moisture Proofed ... Built to last, will not chip, flake or crack ... Asbestos Protected.

## Easy to Apply

Flexible... Applies easily to inside or outside of round, rectangular or irregular ducts... Cuts with a knife or snips... No lugs, bolts, screws or wire to bother with... Easy to handle on the job.





## Comes Complete

Nothing else to buy...DUX-SULATION comes in a roll 36" wide containing 100 square feet, includes special adhesive for applying, and Asbestos Protected corner and joint strips...Packaged for easy stocking, shipping and handling.

## FLEXIBLE DUCT CONNECTION

A superior woven Asbestos Flexible Duct Connection with both edges salvaged to prevent fraying or ravelling, and to make a tight, permanent, sound proof joint. It can be clamped, bolted or screwed into place. Each roll is 6" wide and 50 feet long.



DUX-SULATION

DUX-SULATION

Write Any of the 4 Companies for Information

## GRANT WILSON, INC. CHICAGO

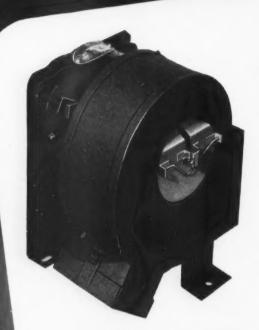
PLANT RUBBER & ASBESTOS WORKS • AIR CONDITIONING UTILITIES CO. • ATLAS ASBESTOS CO., LTD.

San Francisco, Cal.

New York City, N. Y.

Montreal, Canada

## FURNACE VAPORIZING BURNERS give new possibilities



Furnace vaporizing burner units are gaining in popularity because they combine low initial cost and economical operation with satisfactory performance—a result that can now be expected when "Genuine Detroit" oil burner controls are used.

No longer is it necessary to depend on the chimney to produce a draft sufficient for proper combustion. This essential but uncertain factor need cause no concern on jobs that are equipped with "Genuine Detroit" combination air and fuel delivery control units.

It is important information for the dealer to know that the control of air and oil delivery are factory set, the complete unit ready for installation and operation when received from the manufacturer.

Made to meet the control requirements of vaporizing burners, "Genuine Detroit" furnace controls are available in the various types and combinations demanded by the industry.



DETROIT LUBRICATOR COMPANY

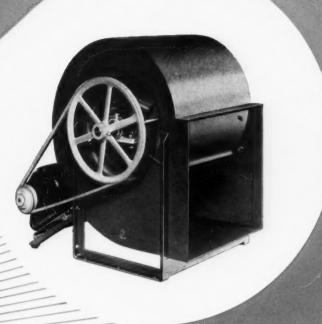
General Offices: DETROIT, MICHIGAN



## EASY TO SPOT THE

eader FOR 1941





Low speed, high delivers. Variable speed driver. Automatic bett tightening device. Automatic device automatic device automatic device. Automatic device automatic device d





DELUXE PACKAGE UNIT FURNACE BLOWER, Knock down construction, Easily assembled, Low speed, high speed, 2-speed control avail-able at slight extra cost. 16 sizes . . . model for every need.





LAU VARIABLE SPEED PUL-LEYS. Accurately machined from close-grained cast iron. Noiseless operation. Speed variations



LAU BLO-ETTE PACKAGE UNIT. Shipped assembled to go through any door. Low cost. 5 sizes up to 14".



NEW 400 SERIES BLO-ETTE. The lowest priced blower in all Lau Blo-Ette History. Made to sell own-ers of 5 and 6 room dwell-ings. Easy to install. Shipped assembled . . . . goes through any door. Two-speed control available at slight extra cost.



LAU CONSTANT SPEED PUL-LEYS. Accurately machined from close-grained cast iron. Accurately balanced . . true running, precision bored.



I.AU BLOWER WHEEL. Squirrel eage, forward curve, multi-blade type wheels. Double inlet, double width, All die formed parts. Dynamically bal-anced. Guaranteed true and without vibrations at operating sneeds.

## Complete Line of

## **AU BLOWERS**

## Meets Your Demands for QUICKER SALES, MORE SATISFIED CUS-TOMERS, and BETTER PROFITS

Looking for a winner? Then look to LAU BLOWERS. It's easy to spot them as the leader when hundreds of manufacturers, jobbers and dealers are depending on this dependable source of supply. And more than 60% of the leading furnace and cooling manufacturers in America are including Lau equipment in their forced air units.

NEW MODELS OPEN NEW MARKETS
FOR YOU
With the new 400 Series BLO-ETTE—designed to
meet the demand for forced air heating in 5 and
6 room dwellings, and a more complete range of
larger units, you can now reach prospects you never
could sell before. Lau can supply all your needs for
blowers.

NEW IMPROVEMENTS FOR LASTING SERVICE

Refinements in construction of scrolls, wheels, and bearings are constantly being made. Constant improvement, constant vigilance in production mean satisfied customers for you—no kick-backs and fewer service calls. These blowers are loaded with sales features. Display them.

Retures. Display them.

\*\*NEW LOW PRICES . . . NEW PROFITS FOR YOU

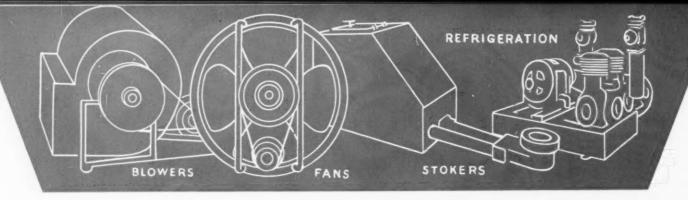
Lau now offers BLO-ETTE equipment at the lowest prices in Lau's entire history. With the new low cost units you can offer the right equipment for smaller homes at a price that lands the job and nets a better profit for you. And with the DeLuxe Package Units you can sell all types of larger homes. Both DeLuxe Units and Blo-Ettes are easy to install and service.

service.

With preparedness in mind, we have stocked sufficient quantities of raw materials in our warehouse. This, plus our modern production methods and enlarged plant capacity, enables us to meet your demands promptly. Let us tell you more about Lau Blowers and how they sell.







## MAUREY V-PULLEYS

## The Choice of Those Who MUST Have DEPENDABLE PERFORMANCE

Heating, Ventilating and Air Conditioning Systems, Stokers, Blowers, Fans, Pumps must be always ready for instant operation. Manufacturers of installations of this type have found through experience that MAUREY V-PULLEYS are their best insurance against pulley failures that cause break downs and annoying "call-backs." MAUREY V-PULLEYS are designed and made by engineers with wide experience who understand the problems of F. H. P. transmissions. They are accurately made, finely balanced and true running.

There is a MAUREY V-PULLEY, in either Steel or Cast Iron, for every pulley need. Ample stocks are available in a wide variety of sizes for "A" and "B" Belts.

WRITE US ABOUT YOUR F. H. P. PULLEY PROBLEMS—WE'LL SEND COMPLETE INFORMATION.

MAUREY MANUFACTURING CORPORATION
Wabash at 29th CHICAGO, ILLINOIS



NEW 3-SPOKE CAST IRON



NEW DESIGN LIGHT WEIGHT CAST IRON PULLEY



HEAVY DUTY



TYPE 3 STEEL MACHINED STEEL HUB



TYPE 4 STEEL MALLEABLE IRON HUB



VARIABLE PITCH DIAMETER

New Cast Iron construction. Adjustment for 30% speed variations. Fine, accurate, milled threads—20 to the inch assure close adjustment

# Three steps forward /ot/94/

The best way we know of to express our appreciation for your past business is to take steps to insure that we can serve you even better in the future. At the beginning of the new year, therefore, we are pleased to announce the following important improvements to OSBORN facilities:

- 1. Enlarged general offices at Cleveland with new equipment for faster handling of orders and a large display room for the use of our customers.
- 2. The addition of 8,000 square feet of floor space at our Buffalo warehouse to permit larger stocks and more prompt deliveries.
- 3. More than doubling of the size of our Cincinnati warehouse to care for the needs of this busy section.

Indications point to a busy year in 1941 for the sheet metal industry. Some materials and machinery, as you doubtless know, may be difficult to obtain. These OSBORN warehouses have been enlarged and more completely stocked for just that reason. May we, in a spirit of helpfulness, suggest that you make use of them?



CLEVELAND

or Y

il-

STEEL

ABLE

HUB

TER
ustment for
rate, milled

1541 East 38th Street, HEnderson 2824

BUFFALO

64 Rapin Street, TAylor 4600

CINCINNATI

3240 Spring Grove Avenue, Klrby 4700

DETROIT

690 Amsterdam Avenue, TRinity 2-2330



A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

AMERICAN ARTISAN, JANUARY, 1941



## The Most Efficient

## MONOGRAM Automatic OIL BURNING FURNACES

## WINTER AIR CONDITIONERS



Model No. 250 150,000 B.T.U.

These units are made in three sizes, all beautifully finished in pastel green ripple with all chrome hardware. Model No. 125—90,000 B.T.U.—Model No. 150, 120,000 B.T.U.—Model No. 250—150,000 B.T.U. Large removable panels in both the front and rear of the cabinet give easy access to both inner chambers. Double Baffle in heating drum—an exclusive MONOGRAM feature for this type of unit. Automatic Oil-Air Control set, Automatic Humidifier, Combination Limit Control and Blower Switch and Automatic Draft Regulator are all standard equipment.



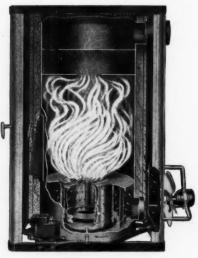
Sectional View Showing Double Baffle Feature

## **BOOSTER GRAVITY UNITS**



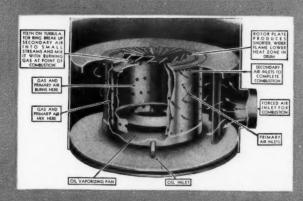
Model No. 200 125,000 B.T.U.

Booster Gravity units made in three sizes, all beautifully finished in pastel green ripple with all chrome hardware. Model No. 75—75,000 B.T.U.—Model No. 100—90,000 B.T.U.—Model No. 200—125,000 B.T.U. Large removable panel in front gives easy access to inner chamber and heating drum. Double Baffle in heating drum—an exclusive MONOGRAM feature for units of this type. Automatic Oil-Air control set and Automatic Draft Regulator are standard equipment. Limit control and Automatic Humidifier are optional.



Sectional View Showing Double Baffle Feature

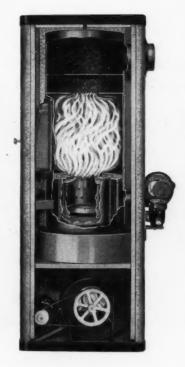
## Automatic Units for 1941



A CLEAN QUIET GAS

#### FULL FORCED UPRIGHT AIR CONDITIONER

Model No. 102, 75,000 B.T.U. furnished complete with Automatic Oil-Air Control set, Combination Limit Control and Blower Switch and Automatic Draft Regulator. Automatic Humidifier and Filters optional.



featuring the

#### MONOGRAM Patented Turbulent Flame "Vaporizing" Burner

This wonderful new burner has revolutionized the oil device industry by its outstanding performances and efficiency. Absolutely unlike any other oil burner on the market and definitely more efficient.

The oil is vaporized quicker, more completely and then by the proper mixture of both primary and secondary air, made possible by the exclusive MONOGRAM Patented air mixing feature, it produces a clean, quiet gas flame made from oil. MONOGRAM has used the same principle of combustion governing the gas burner and has obtained equally efficient results.

The MONOGRAM Patented Turbulent Flame "Vaporizing" Burner has definitely proven to (1) produce more heat from less oil, (2) to produce a more efficient, clean combustion free from SOOT or CARBON, (3) to provide the user with a more dependable and trouble-free heating service having established the highest known operating efficiency for all oil heating devices. This wonderful new burner is featured in all MONOGRAM Automatic Warm Air Oil Burning Furnaces, the units that will increase your Profits in 1941, offering a more efficient and trouble-free automatic heating service that costs less to operate!

#### DEALER HELPS GALORE

MONOGRAM has arranged a complete merchandising program of dealer helps for the coming year to be used in the promotion of MONOGRAM furnace sales. So don't delay or you may be too late. Apply today for the exclusive dealer franchise for MONOGRAM Automatic Warm Air Oil Burning Furnaces in your territory. Write for our new 24-page illustrated catalog and price list, giving complete information and details regarding all of our units.

Make your profits with MONOGRAM this year—for over 44 years manufacturers of quality merchandise.

#### THE QUINCY STOVE MFG. CO.

44th Year of Quality

QUINCY - - - - -

ILLINOIS

JOBS LIKE THESE ARE HANDLED BEST WITH UNISHEARS



CUTTING SECTION FROM STAINLESS steel sink, No. 16 Unishear follows straight and curved lines, cuts fast and clean, with no distortion of

# my

STANLEY **Builds The** 

UNISHEAR



CONTINUOUS PRODUCTION in 12 gauge hot rolled steel is this 144A Unishear's job. It's built to handle continuous production or prefabrication of sheet metal products.



NO STARTING HOLE NECES-SARY FOR INSIDE CUTS. This plant's Stationary "O" type Unishear cuts cost and time required for setting up heavy machines and making trimming dies. Cuts curves down to 1/4" radius.

EASIER TO HANDLE THAN SNIPS and does smoother, cleaner work. Cuts 18 gauge hot rolled steel . . . any pattern. The pivoted handle provides a comfortable grip for using the "Mighty Midget" Unishear in any position. Ask for a demonstration, or write for literature. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

## STANLEY



ELECTRIC

A Complete Line For Industry - "Cost Less Per Year"













Here's a real "Live Line" for 1941..

## WISE FURNACES





## for GRAVITY JOBS

A "live line" usually means plenty of action . . . and this Wise Furnace line for 1941 is no exception! Modern, efficient and highly saleable, it will help swell your profits on new or replacement installations and will enable you to give each customer a tight, economical job that will perform at top efficiency under the most trying conditions.

Illustrated at left is the famous Wise Series "A" Gravity Furnace. Features such as: the permanent domestic hot water supply (available at slight extra cost), one-piece ashpit and lower front to eliminate joints and make installations easier, one-piece cellular firepot and self-cleaning radiator which will not fill up with soot and dirt, make this unit outstanding from a construction standpoint, and easier for you to sell.

It will be much easier for you to satisfy your customers and yourself by specifying and installing a Wise Series "A" Furnace.

#### for AIR CONDITIONING

You'll run into quite a few air conditioning jobs in 1941 and if you're selling the Wise Air Conditioning Unit, you won't have any trouble in making your installation highly satisfactory.

Whether the unit goes into a new or modernized basement, you can rest assured that its trim, modern styling will blend perfectly. Uses the tough, efficient Wise Series "A" as a heating element and consequently is good for many, many years of clean, healthful heat.

Further information on both furnaces will be gladly sent upon request. Write today.



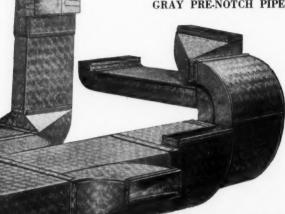
WISE FURNACE CO.

AKRON OHIO

Get GRAY QUALITY...

Be sure every job is right!

NOTE NEAT AIR TIGHT CONNECTIONS WITH GRAY PRE-NOTCH PIPE.



THE most effective way to keep profits consistent is to be certain the job you install is done right! Constant call-backs for service are expensive and can be forestalled by installing Gray "Snap-Rite" Fittings on every job. Gray manufactures a complete line of Air Conditioning and Warm Air Furnace Fittings designed to permit quick assembly and erection, producing an air-tight installation, low in cost.

The new Gray "Pre-Notch" feature makes it possible to get perfect branch take-off installations which are smooth, neat and air-tight. "Pre-Notch" is an exclusive Gray feature on all trunk pipe, elbows and reducers. All notching on trunk pipe corners and take-offs is eliminated through this factory-made notch.

#### GUTTER and CONDUCTOR FITTINGS

Also available from the Gray line are superior gutter and conductor fittings. Designed and built by men who understand your problems in installation, you'll find they save you much time on the job. An outstanding feature of these hangers is the reinforcement finger which extends up behind the bead. This holds the gutter out and in position and prevents it from sagging inwards when a ladder is placed against it. Our new modern wire clip simply snaps over the bead. Clip is attached to hanger when shipped and is adjustable. All other necessary fittings; such as, end caps, outlets, pipe ornaments and gutter cutters are available.

Write today for catalog with complete information.

## GRAY METAL PRODUCTS INC. ROCHESTER NEW YORK





Note the reinforcement finger which extends up behind the bead,



#### THE COMPLETE GRAY LINE INCLUDES:

FURNACE PIPE AND FITTINGS AIR CONDITIONING PIPE AND FITTINGS GUTTER AND CONDUCTOR FITTINGS

# GRAY Snap-Rite GRAY



#### **Furnace Manufacturers** Find Viking Blowers More **Efficient and More Quiet**

Viking Engineers are designing blowers to meet many and varied needs. The following actual cases\* from our files are typical.

MANUFACTURER A required abnormally high pressures, but was limited by space as to size of blower. At no extra cost Viking produced a special unit which answered perfectly and enabled him to dominate a highly competitive market with a superior product.

MANUFACTURER B'Sfurnace of unique design required blower and motor to fit in extremely limited space—with motor beneath blower. Need for extra-quier performance and high pressure were further complications. Viking designed a simple, effective mounting, and, incorporating certain improvements in blower outlet, increased pressure, reducing over outlet, increased pressure, reducing power

MANUFACTURER Chad been using 1/3 H.P. motor on popular size units for wide range of capacities. A Viking blower, properly adapted, showed such improvement in performance and efficiency that a ½ H.P. motor, which cost ½ less, provided ample power with a suitable margin of safety at full capacity.

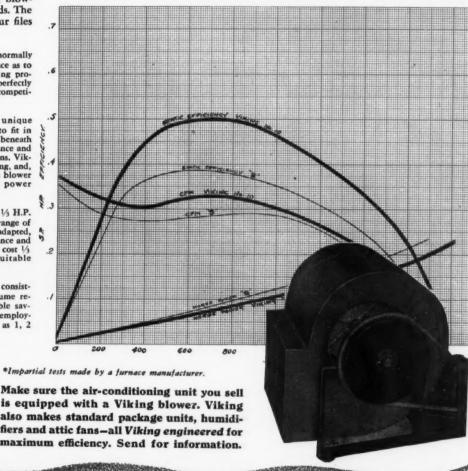
MANUFACTURER D had a design consisting of sectional units, but whose volume requirements were moderate. Considerable savings in stock and cost were effected by employ-Viking blowers in multiple, such as 1, 2 and 3 wheels on a single shaft.

\*Names upon request.

## SILENCE Sells VIKING BLOWERS

To the question "What Size Blower?" Viking has written a new answer. Within the past six months Viking has developed a formula that has resulted in a new series of blower designs which, size for size, give more air at higher pressures and with less noise than has ever before been possible. Performance requirements can thus be met with a smaller blower-at a considerable saving of cost and space.

\*Chart Showing Performance of Viking Blower as compared with the competitive make second in performance.



\*Impartial tests made by a furnace manufacturer.

is equipped with a Viking blower. Viking also makes standard package units, humidifiers and attic fans-all Viking engineered for maximum efficiency. Send for information.

KING AIR CONDITIONING CORPORATION

9500 RICHMOND AVE., S. E., CLEVELAND, OHIO

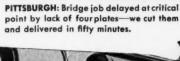
# JUST AN OLD SCULLY CUSTOM... filling orders promptly!

CHICAGO: Rush order from railroad received at 4:20 p.m.—we delivered goods at freight house 5:15 p.m. the same day.

CLEVELAND: Order for beams cut to special lengths received 5 p.m.; delivered in Columbus 9 a.m. next day.

















RAST, friendly service is the rule at each of the eight Scully warehouses—whether your order is large or small. That's what has made the Scully name famous. We have huge stocks on hand, ready for immediate delivery. And our warehouses are located in the great manufacturing centers—an-

other reason why we can get your orders to you in such a hurry. So now—when quick delivery is so important whether or not you are working on defense business — give us a trial. Call Scully — for steel, steel products, copper or brass. Phone, wire or write the warehouse nearest you.

Send for the Scully Stock List and Reference Book-it's free.

#### SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO ST. PAUL - MINNEAPOLIS NEWARK, N.J.

The Mark of Quality



CLEVELAND · PITTSBURGH BOSTON · BALTIMORE ST. LOUIS

The Mark of Service



# NORGE FINE-AIR PRESSURE TYPE—OIL-FIRED WINTER AIR CONDITIONER 165.000 B.T.U. Output. For \$10,000 to \$15,000 homes. **NORGE Model 120** PRESSURE TYPE-OIL-FIRED WINTER AIR CONDITIONER 120,000 B.T.U. Output. For \$5,000 to \$10,000 homes.

# NORGE

CONDITIONING

#### **For Homes Costing** \$1,500 to \$15,000

Norge—Borg-Warner Oil Burning Units Bring Modern Heating Within the Reach of Every Home—and Quick, Substantial Profits Within the Reach of Every Heating Contractor.

Two of America's most famous names are linked in the engineering and manufacturing of these modern, super-efficient heating and conditioning units-Borg-Warner, famous for skill in producing fine machine parts, and, Norge, a household word in a million-and-a-half American homes.

The resources of the Norge-Borg-Warner organization are concentrated upon building into these units many features that make them exceptionally easy to install, extremely efficient in operation, durable in use, easily serviced and low priced to the consumer with full profit margin to the heating contractor.

They are easy to sell because many of these features are exclusive and have strong buying appeal and because the names Norge-Borg-Warner enjoy acceptance everywhere.

> NORGE HEATING AND CONDITIONING DIVISION BORG-WARNER CORPORATION, DETROIT, MICH.

Norge Heating and Conditioning Products are distributed solely through the recognized heating trade.

#### EXCLUSIVE FEATURES OF NORGE WINTER AIR CONDITIONERS

#### FINE-AIR MODEL

Burner boosts efficiency

Patented Spiral Ramp Economizer gives 29 ft. flu gas travel and very low stack temperatures

Patented Double Cylinder Economizer gives exceptionally large air heating surface

Patented Tell-Tale Safety Filter Bypass automatically by-passes air around filters when they need changing

#### MODEL 120

Norge automatic Whirlator Oil Pull-thru Auto-Draft eliminates all draft problems

Patented Spiral Ramp Economizer gives 17 foot flue gas travel and stack temperatures 290 to 325°

Patented Safety Filter By-Pass automatically by-passes air around filters when they need changing

All points of adjustment or service are just inside front panel

Single Power Unit

Factory wired, complete with all controls

Automatic Electric ignition

These models, although modestly priced, do everything that any Winter Air conditioner does, regardless of price.

## NORGE HEATING AND CONDITIONING UNITS

#### are "FAMOUS FOR FEATURES"

Here are some typical features that make these units unique:

Models OA-63: OB-60: OC-60.

"L"-SHAPED HEAT DISTRIBUTOR-25% to 40% more heating surface.

ALL-PORCELAIN FINISH inside and outside heat distributor, resists heat, acids, soot, moisture, rust.

DOWN-DRAFT WHIRLATOR feeds air into heart of flame.

TRIPLE-AIR OIL BURNER.

AUTOMATIC CHIMNEY DRAFT REG-ULATOR.

CONSTANT LEVEL OIL METER.

MANUAL OR AUTOMATIC CONTROLS — Models OA-63; OB-60; OC-60.

SILENT, RUBBER-MOUNTED BLOWER -Model OA-63.

These units are "packaged," completely set up and are easily carried through any doorway. Installation is simple and installation costs are very low. These units, installed. are comparable in cost to old style, hand-fired furnaces and heat circulators.



Send the coupon for literature and details

See NORGE Before You Buy!



#### **Exclusive Features of Norge Model 90 Winter Air Conditioner**

Pull-thru Auto-Draft eliminates all

draft problems
Patented Spiral Ramp Economizer
gives 17 foot flue gas travel and
stack temperatures 290 to 325°

All points of adjustments or service are just inside front panel Single Power Unit. Factory wired, complete with all controls Automatic electric ignition

COUPON

MOM

This low-priced unit is a completely automatic winter air conditioner.

Norge Heating and Conditioning Division, Borg-Warner Corporation, 12345 Kercheval Ave., Detroit, Mich.

INFORMATION about your 1941 Heating and Conditioning line.

Name

Firm

Address

City

State

Type of Business

**NORGE Model OA-63** OIL-FIRED FASTEMP FURNACE 70.000 B.T.U. Output. For \$3,000 to \$6,000 homes. EL PHI RI **NORGE Model OB-60** OIL-FIRED FASTEMP FURNACE 65,000 B.T.U. Output. For \$2,000 to \$5,000 homes. NORGE Model OC-60 OIL-FIRED FASTEMP FURNACE 60,000 B.T.U. Output. For \$1,500 to \$3,500 homes.

FOR THE VAST

\$1500 to \$5000 SMALL HOME MARKET

• Good things rarely change. The practice of placing three triangles diagonally across every sheet of galvanized Armco Ingot Iron has been justified by years of usage.

RKET

No matter how these sheets are cut, all or part of at least one triangle will show. This positively protects your work. Architects and engineers can tell at a glance that you have followed their specifications to the letter.

Your customers also will be glad to see this familiar trademark on their sheet metal work. Many of them have learned from experience, or from Armco's 27 years of national advertising, that this symbol stands for utmost durability.

Careful selection of raw materials and exacting production control in the Armco mills make certain this record of proved durability is maintained. Every sheet of galvanized Armco Ingot Iron is alike—alike in workability, high refinement and uniform weight of coating.

Use galvanized Armco Ingot Iron or Armco Ingot Iron Paintgrip for

ies and valuable shop-aids, just get in touch with the nearby Armco Distributor. Or, write us direct. The American Rolling Mill Company, 241 Curtis St., Middletown, Ohio.

work to be painted on that next job. The blue triangle trademarks will protect your work and give your customers assurance of long, trouble-free service. For quick deliver-

GALVANIZED



ARMCO INGOT IRON

# 500 AIR · MAZE FILTERS

## Keep the Spots off Walt Disney Characters

It takes thousands of individual drawings to make up a Walt Disney animated picture. These drawings are many times enlarged when projected on the screen and the tiniest speck of dust or dirt on any of them would show as a large gray smudge and ruin the film.

Hence the Walt Disney Studios-particularly where the "shooting" and film cutting is done-must be kept scrupulously clean and absolutely

dust-free. To insure this desirable condition the Walt Disney Studios have installed over 500 AIR-MAZE Air Filter Panels. This installation, specially designed for their requirements, includes both the regular AIR-MAZE Type "B" and Kleenflo Air Filters.

Against the most severe tests this huge and interesting AIR-MAZE installation has kept the spots off Walt Disney beloved characters.

highest efficiency the Walt Disney Studios clean the filters even more than usually necessary. Yet despite this extreme care they report that the actual cost of cleaning and recharging each filter is only 3 cents per panel. The whole operation of cleaning and recharging each AIR-MAZE filter takes about two minutes, after which they have the appearance and performance characteristics of brand new filters. Read the letter reproduced here—then write AIR-MAZE for help in solving your air filtration problems.

To keep the AIR-MAZE installation operating at

WE'LL BE SEEING YOU (WE HOPE) JANUARY 13-16 AT BOOTH No. 122 THIRD ALL-INDUSTRY EXHIBITION, STEVENS HOTEL, CHICAGO, ILL.

AIR-MAZE CORPORATION 5200 HARVARD AVENUE CLEVELAND,



September 26, 1940

Air-Mase Corporation 5200 Harvard Avenue Cleveland, Ohlo

Attention: Mr. F. M. Paul Sales Manager

In reply to your inquiry of August 29, 1940, regard-ing our experience with the filters installed in our air-conditioning plant, we are pleased to state they have been exceedingly satisfactory.

The severest test imposed on the filters came last summer in the Camera Building, when with another building under constructionmext door, and excavating showels and concrete mixers running full blast for weeks just outside the Camera Building air intake, the Air-Maxe filters maintained inside the building the scrupulous cleanliness needed for the "shooting" of PIMOCHIO. A small speck of dirt under the heavy lights of the camera can easily spoil a picture by producing halations and other undesirable light effects and it was very gratifying to see your filters stand up to this test.





# INDEPENDENT REGISTER

TWO NEW CATALOGS FOR 1941



SEND FOR YOUR COPIES TODAY

• Here are two new catalogs, arranged to make it easy for you to find just what you require in air conditioning and gravity registers and grilles.

In them you will find explained the features that make Independent Registers, Grilles and Cold Air Faces outstanding in efficiency, durability and fine appearance, including many exclusive features that give Independent distinct leadership in quality and value. You need these books in your business. Send for them today. They are free.

## THE INDEPENDENT REGISTER COMPANY

3747 E. 93rd STREET . CLEVELAND, OHIO



REX Blowers are recognized everywhere for outstanding performance and trouble-free service. Their record of leadership is further emphasized by the fact that an increasing number of national manufacturers are selecting them as standard equipment on their product.

The definite superiority of REX Blowers is based on their heavy, rigid construction, smooth operation and operating excellence. No matter what type of air conditioning equipment is involved—whether large or small—you can choose a blower from the REX line that is correctly engineered for the job.

There is a wide range of sizes—motors can be mounted on the top or the rear, and the angle of discharge placed in any direction. The "H-P" type is especially well suited for use in compact casings where space is at a premium.

Only a few REX models are shown here. Being blower specialists, we offer you freely our engineering facilities for the design and manufacture of blowers for your specific requirements. Write for our new catalog which contains the latest data on our complete line.

#### Dealers Earn EXTRA PROFITS!

There are plenty of homes in your locality with gravity warm air furnaces whose owners are real prospects for REX Air-Pak Blower Filter Units. Our "How to Profit from Winter Air Conditioning" book explains how to sell these prospects easily.

It also includes specifications and performance data on the many units available to meet every forced air heating requirement. Send for your copy today. It's free and may prove of value to you.



1937 W. 114th St.

Cleveland, Ohio



For the things that count in a DEALER PROGRAM this year and every year, look to

WARM AIR FURNACES AND AIR CONDITIONING UNITS

IN 1940 SUNBEAM SALES SOARED TO NEW HEIGHTS...AND IN 1941 WE'RE PLEDGED TO SHATTER THAT RECORD!

TODAY—right now—is the time to tie in with Sunbeam. For Sunbeam's complete program provides everything you need to bring you local leadership—increased profits and sales.

You'll have a complete line of improved Warm Air Furnaces and Air Conditioning Units for Coal—stoker or hand-fired —Oil or Gas—all with ready-made acceptance by homeowners, architects and builders.

You'll have the advantage of conveniently located Jobbers' warehouse stocks ready for quick delivery any time.

You'll benefit by Sunbeam's national advertising which will work locally for you pre-selling prospects—creating customers.

You'll be able to tie in directly with Sunbeam's national advertising—thanks to colorful new promotion pieces of many types.

And you'll be able to close sales quicker with our Easy Payment Plan that gives your customers as long as 3 full years to pay—gives you cash on installation.

Write today for complete information and for the name of the Sunbeam Jobber nearest you.

Dyright 1941 American Radiator & Standard Sanitary Corporation





#### **BURNER UNITS FOR** Air Conditioning











Star performance at the heart of

the gas appliance—The BURNER!

#### Burners for Every Type of Appliance

Recent years have seen broad advances in the design of all types of air conditioning equipment, and of gas appliances for heating and commercial purposes. No high-sounding phrases or "streamlined styling," however, can alter the basic truth that, in any gas-burning equipment, the BURNER is the heart of the appliance. A 20-year record of satisfactory performance, freedom from servicing, and economy of operation explains the use of Barber Burners by nearly 200 nationally known appliance manufacturers.

Gas burning appliances equipped with Barber Units sell better and perform better. If you buy, sell, make or sponsor such equipment, be sure that the all-important element—the burner bears the name Barber.



# Conversion Burners



Star performance at the heart of

the gas appliance—The BURNERI

#### —for Natural, Manufactured, Butane, or Bottled Gas

The definite superiority of patented Barber Burner Jets results from their unique combustion principle, employing an auxiliary air feed, giving a higher air content to the mixture, and producing really efficient combustion on increased gas pressure. With their perfectly controlled and directed flame, Barber Burners deliver a flame temperature of 1900° on atmospheric pressure.

Only a few typical Barber designs shown here. We are gas burner specialists, and offer you freely our laboratory and engineering facilities on the design and manufacture of burner units appropriate for your specific purposes. Write for Catalog and Price List on Burner Units for Gas Appliances, Conversion Burners for Furnaces and Boilers, and Gas Pressure Regulators.

THE BARBER GAS BURNER COMPANY, 3704 Superior Avenue, Cleveland, Ohio Address Michigan Inquiries to The Barber Gas Burner Co. of Michigan, 4475 Cass Ave., Detroit



R dutomatic

C

# TO MAKE MORE MONE with Hydraulic Action CONTROL

## .... SAVE INSTALLATION TIME .... HAVE LESS GRIEF and WORRY

The time required either to install a White-Rodgers Hydraulic-Action Fan or Limit Control, or a complete warm air heating plant can be reduced materially with White-Rodgers Controls.

Hydraulic Action Controls have dials accurately calibrated in degrees Fahrenheit with cut-in and cut-out indicators for quickly and accurately setting exact temperatures for each application. This simplicity of adjustment, plus higher current ratings, ease of installation and many other outstanding features is saving installation time and eliminating service worries for heating men throughout the country.

White-Rodgers Controls eliminate many needless service calls which are a drain on your profits.

The operating points of these fan and limit controls always remain precisely as set. There is no tendency of the control to drift or to change setting. The furnace manufacturer and user are protected from the reduction in capacity or rating that may result.

White-Rodgers money-saving features can help make 1941 your biggest, most profitable year. Send today, for your copy of the new White-Rodgers Condensed Heating Catalog, Unit R-300.

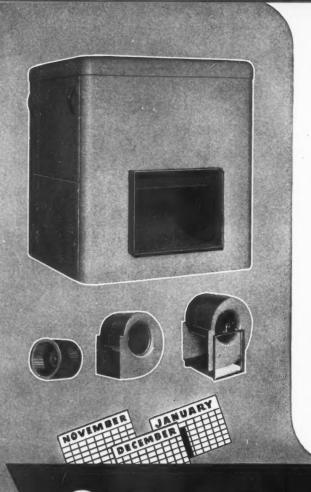
#### WHITE-RODGERS ELECTRIC CO.

Pontrols for Heating . Refrigeration . Air Conditioning

DIE CARE AVE

T IAIVIO MA





# THE BIGGEST BLOWER FILTE Value on the Market

USAIRCO Blower Filter Units have just closed their largest sales year — convincing proof that a great value always wins the business. We'd like you to see and sell this streamlined unit USAIRCO Blower Filter Units have full metal, sound insulated floor. Two side-access doors one on each side, replacing the old rear entry, giving greater convenience for filter-changing and motor oiling. In summer, it means more night air cooling. The filter capacity is greater and more efficient. A simple locking device holds each filter in place. The motor is hinged and rubber mounted. Nationally known motor, Furnacestat and Vari-pitch drive in cluded. All rounded corners, streamlined design, baked enamel finish. Order today a sample of the industry's standard of value.

#### SANIDAIRE the complete PORTABLE HUMIDIFIER

Thousands of homes, offices, hospitals, need this winter health and comfort maker. Meets humidity requirements of 3 to 5 rooms. Sanidaire is a superbly engineered unit. Quiet — centrifugal type fan. Positive centrifugal pump. Wagner motor, slow speed, special design, non-radio interfering. Bonderized steel. Three coats walnut grain enamel. Height  $16\frac{1}{2}$ " — width 16" — depth  $10\frac{1}{2}$ ".



# For Year Kound Profit \* WINTER and SUMMEN WRITE FOR THE US AIRCO 12 MONTHS PROFIT PLAN NOW





#### FOR SUMMER

Sell Comfort Cooling

YOU CAN MAKE MONEY THE Kooler-aire WA

Kooler-aire opens a new field of profits because thousands of stores, beauty parlors, cafes, etc., who can't afford refrigeration, find in Kooler-aire the answer to their prayer for cooling they can afford to own and operate. Our largest syndicate stores are installing Kooler-aire in their locations. Kooler-aire is a package plan from store survey to installation. UsAIRCO helps you sell — shows you how to install. Complete engineering service is available. Over 8,000 Kooler-aires are in operation. Tested, proved equipment that you can make money with. The big comfort cooling market belongs to Kooler-aire — the system folks can afford to own. Build a business in this field. Write for details today.

## UNITED STATES AIR CONDITIONING CORP.

NORTHWESTERN TERMINAL . MINNEAPOLIS, MINNESOTA

Its a
PACKAGE PLAN
from
PROSPECT TO
INSTALLATION



Designers, Manufacturers, Engineers of Heating, Ventilating and Air Conditioning Equipme

There's a
New Leader in
the Control
Field

incing proo

filter-change

r capacity The motor

tch drive i

day a sampl

PLAN

CT TO Ation • Five years ago, Perfex Controls were but dreams in the minds and hearts of a handful of men. Today, Perfex Twin Contact Controls are frequently regarded, from several different viewpoints, as the leaders in their field.

If leadership is measured by rate-of-growth, Perfex *is* the leader among domestic control manufacturers because its sales, and consequently its plant and its personnel, have multiplied over and over again since 1937.

If leadership is judged by technical contributions, by engineering originality and soundness, then Perfex has earned the title because its products reveal the mark of vision in every detail of design and construction.

If leadership is attained through demonstrated quality of product, none can deny the honor to Perfex, for individual service men, dealers, and equipment manufacturers agree that Twin Contact Controls require less service attention than has heretofore been known for any similar instruments.

If leadership depends on the courage and judgment which enables a manufacturer to improve marketing conditions in a whole industry, Perfex has it. The Perfex sales policy has already brought the automatic heating industry a long way toward the point at which an *engineered unit*—complete with controls—can be sold as such with greater profit and satisfaction to all concerned.

The kind of customers a business attracts—the quality of the product with which an accessory is associated—is perhaps the best of all measures, of true leadership. By this most telling measure, Perfex bows to none in the field.



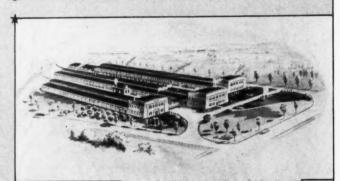
# TWO GREAT Lennox FACTORIES

OPERATING AT FULL CAPACITY IN

- . MARSHALLTOWN, IOWA
- \* SYRACUSE, NEW YORK

And Now... the ever-growing business enjoyed by Lennox Dealers makes necessary the construction of





# A Third LENNOX FACTORY



AT COLUMBUS, OHIO

Now being built, and soon scheduled for full-line production, this new Lennox plant will enable Lennox to give even better service to mid-Western and Southern dealers.

Faster deliveries—lower freight rates—quicker engineering service—the best-engineered, most complete line of steel furnaces in the world! With a combination such as this, how can you help make a profit in the heating business?

Write Joday
FOR COMPLETE
INFORMATION

THE LENNOX FURNACE CO., INC.
Marshalltown, Ia. • Syracuse, N.Y. • Columbus, Ohio

M

## Here's WHY STOKER-OLA



Look at the picture. The simplest stoker mechanism ever designed! Only 2 major working parts! Not a gear-tooth in the whole assembly! No oil to change (or to leak!)! An unequalled smoothness of operation—and, best of all, EVERY POINT MENTIONED ABOVE IS EASILY DEMONSTRATED TO PROS-PECTIVE CUSTOMERS IN A MOST CONVINCING MANNER! When you "Show 'em" they believe their eyes and ears—and the more "mechanical" the man of the house is, the more he appreciates the effective simplicity of the STOKER-OLA DRIVE.

And STOKER-OLA dealers DO make profits. Every past customer is voluntarily on the "sales-force." One model (pictured below) fits 90% of all domestic jobs—others meet all other types of domestic and industrial installations. Servicing and stocks-of-parts are minimized. AND STOKER-OLA'S PRICE

LETS YOU COM-PETE EVEN ON JOBS!



We'll let someone else get in a word. One of our dealers is closing such a satisfactory year that he wrote to tell us about it—and we know of others who could write similar letters. Just a paragraph or two will suffice to indicate how YOU can feel a year from now!

Mean More Years"

"No Gears

Lest year at this time we wrote to you to tell you double our sales in 1940. He have Mora than doubled our season in arms.

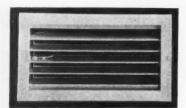
Resp our schedule for the next seles! In fact, if so
EX JANUARY FIRST!

HAVE it have we all admit that only with Stoker old could selling itself Stoker old selling itself stoker old selling itself and and we mant to say thanks for the fine service and during the recent years. We feel quite sure that you

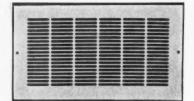
As It Burns"-And It Will Earn south of the Profits For couper of the street of the st

DVANCE APPLIANCE CO., 808 S. Washington St. PEORIA, ILLINOIS





FH-100 Adjustable Register for Walls



R-600 Economy Register for Low Cost Homes



H-400 Adjustable Gravity Register

# FOR EVERY INSTALLATION

Waterloo Registers for 1941 offer a bigger, broader selection than ever before. There's a complete line of Registers for forced air systems, and an equally large selection of gravity registers. A wide price range, too—from the extremely low-priced R-600 series to the smart Venetian-type adjustable registers. Outstanding in appearance, high in efficiency, ruggedly constructed, these quality-built Waterloo Registers are also leaders in value. See how the Waterloo line will fit into your business for 1941. Send today for free illustrated catalog.



FGH-0-45 Venetian-type Return Grille

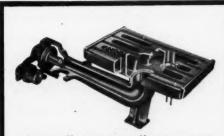


BEF Close-Mesh Floor Register

WATERLOO REGISTER CO., - - Waterloo, Iowa - - Seattle, Wash. Principal Cities

# SELL YEAR ROUND COMFORT FOR ONLY 12.69 EXTRA PER FOR O

The Chrysler Airtemp combination heating and cooling unit is available in several capacities. The furnace is made for use with either gas or oil. Combustion chamber is one-piece chrome steel. The cooling coil not only cools the air but condenses its excess moisture. The radial compressor is sealed with its motor in a permanent bath of oil.



#### AIRTEMP "SILENT FLAME" GAS BURNER

Features: no pop in starting or stopping
—no sound while burning—no flash backs.
Burns natural, mixed or manufactured gas.
Rustless, chrome-steel grids—cannot clog.

#### Add <u>Cooling</u> to Your Heating Sales For More Profits, Less Competition

The Chrysler Airtemp combination unit is the only practical and economical winter and summer air conditioning equipment for medium-priced homes. On a 20-year F.H.A. contract you can sell the cooling unit at an additional cost of only \$2.69 on monthly payments!

Airtemp has combined its forced-air furnace—now in use in thousands of homes—with its packaged cooling unit—which has given satisfactory service in shops, offices and restaurants for years—to provide this new, low-cost combination unit. Mass production of both cuts costs. When you install the furnace and ducts, your customer already has nearly two-thirds of a year-'round air conditioning system. For the same blower, filters and ducts are used in summer cooling. The cooling unit can be added later. What an exclusive sales story for Chrysler Airtemp dealers! Send for full information at once.

Oil, Gas and Coal Furnaces . . . Hot Water and Steam Systems . . . Oil Burners . . . Room Coolers . . . Packaged Air Conditioning Units . . . Complete Central Cooling Systems

HRYSLER AIRTEMS

THE DIVISION OF THE CHRYSLER CORPORATION, DAYTON ONIO

AIRTEMP DIVISION, CHRYSLER CORPORATION, DAYTON, OHIO.

I am interested in receiving complete information on the Chrysler Airtemp combination heating and cooling unit.

Name

Address\_





### INSTALL Vernois FURNACES FOR REAL PROFITS!

The simple and logical fact that gravity heat is your biggest and most profitable market was never more apparent than it is right now. Industry figures reveal that over 60% of the 500,000 furnaces sold in 1940 were gravity jobs, and an even larger total is looked for this year. Not much doubt as to whether or not it's a real, live market, is there?

The most important point to consider in going after a field like this is the gravity unit you sell. You must be certain that the furnace you install will perform season after season, year after year with the utmost efficiency, cleanliness and economy. If it doesn't . . . well, you're going to have plenty of trouble, getting your customer to recommend you to others in the market for a new heating plant, not to mention the loss of profit in return calls.

The surest way to prevent occasions like this is to specify and install the Mt. Vernon "Vernois" Furnace on every job. Strongly constructed of Vernalloy, the metal famous for its "Hell on Earth" test, and with many years of excellent performance behind every furnace installed, this unit is your guarantee to the customer of a long-lived, top performing installation.



WIT. VERNON FURNACE & MFG. CO.



## Specify Dynamically-Balanced DELCO MOTORS

It's just a line in the specifications: "Delco motors to be used for oil-burner, air-conditioning equipment and blowers"—but it's a line that goes a long way in assuring quiet operation. And home builders and buyers are demanding heat that is quiet as well as clean.

There is less noise transmitted through heating ducts when Delco motors are used, because there is less vibration in the motors. Delco motors of all sizes and types are dynamically balanced to exceptional accuracy on a special machine developed by Delco Products and General Motors Research. Alignments are maintained throughout production by modern manufacturing methods, and particular emphasis is given to accurate machining of shaft and bearing surfaces.



#### QUIET-STARTING As Well As Quiet-Running

The Delco Centrifugal Switch provides positive, snap-action starting—eliminates "fluttering" when motor goes into operation. Other Delco motor features are the Delco Thermotron for complete overload and overheating protection, and the Delco End-Play Take-up Device.

The Delco Two-Speed Motor illustrated above is particularly recommended for blower applications. Consult the Delco Products Engineering Department for recommendations.

DELCO DELO MOTORS

DIVISION OF GENERAL DAYTON, OHIO MOTORS CORPORATION

35

q

#### ANOTHER FAST-SELLING ADDITION TO A POPULAR LINE ... A SUPER-COMPACT AUTOMATIC OIL OR GAS FURNACE

The news-making Majestic 306 is already winning wide approval for its heating efficiency! It's a new, low cost, fuel-saving, completely automatic winter air-conditioner, in a space-saving, "packaged" unit that is completely wired and ready to install when it leaves the factory!

The unit is fully enclosed in a rich blue Hammer Craft cabinet. There's not a single outside control! All that remains to be done after delivery (except piping and registers) is to connect the oil (or gas) lines and attach the thermostat and line wires! And by simply changing the burner unit, the 306 can be converted from either type of fuel to the other.

FUELLESS

HOME INCINERATOR

Burns all garbage and rubbish. No cost for fuel! Clean, quick, sanitary, odorless! Neat, complete, and compact. Holds three bushels. Connects to any 8" furnace flue. For basement, utility room or garage. Easy to install—and retails at Only \$29.95

WRITE FOR DETAILS ON

MAJESSIC NO. 30 INCINERATOR

MAJESTIC NO. 30 INCINERATOR

The entire unit is only 24 inches wide, 36 inches deep and 63 inches high, including the complete blower unit. It not only assures maximum economy of space, but the unit has been designed so that it can be placed in any corner, close to any wall. Ideal for small basements or for first floor utility rooms!

Here is a heating plant that is perfectly

suited for any small home, store or office! structure—your biggest Majestic and most profitable field. Send for details on the Majestic 306 today.





### There's a MAJESTIC for every job!

Majestic offers you a complete line of heating plants! You get the right unit for every installation, from the smallest low-cost dwelling to the large country home or clubhouse . . . units that range from the low cost, competitively priced, hand-fired steel furnace to the big, deluxe automatic winter air conditioner. And the Majestic line includes both gravity and forced-

air plants, with gas-, oil-, stokerand hand-fired units.

A 35-year reputation for highest quality construction and unsurpassed heating performance makes Majestic a name you can depend on for thorough. lasting satisfaction. Numerous Majestic installations now in service have already given 10, 20 and 30 years of efficient, economical service with minimum upkeep, and are still going strong . . . proof that Majestic furnaces meet every demand for durability and dependability!

Through our Planning Department, Dealer School and other cooperative activities, Majestic dealers are given every aid for building an efficient and highly profitable business. In dealing with a single source of supply, you increase your profits by simplifying your business operations. It will pay you to concentrate your efforts exclusively on the Majestic line . . . you get a head start in business volume by taking advantage of Majestic's wide reputation for QUALITY! Write

today for complete details on our Dealer Franchise

Majestic has a complete line for better heating. Send for bulletins on these modern, quality furnaces TODAY!



JESTIC

782 ERIE STREET

HUNTINGTON, INDIANA

# ATTENTION ALAR CONDITIONING LONTRACTORS

# Commercial Offers You THIS NEW Venturi Type FAN HOUSING



This literature contains all the facts and figures covering the new Commercial Venturi Type • For the first time in the air conditioning field, a Presteel Fan Housing with the Venturi Section drawn down in one operation is available to you as a standard item.

Designed for exhaust and ventilating fans and unit heaters—furnished in a popular range of sizes and gauges—and offering features that decrease cost and increase fan efficiency.

In your 1941 air conditioning installations use Commercial Venturi Type Fan Housings.

Send today for the folder which contains the full story—and lists the sizes, gauges and features we offer you.

The COMMERCIAL SHEARING & STAMPING COMPANY

1775 LOGAN ST.

YOUNGSTOWN, OHIO

THE FIRM THAT IS FAMOUS FOR TANK HEADS, CIRCULAR SHAPES AND PRESSED STEEL PRODUCTS

# A SAMPSEL Control

TURNS A Warm PROSPECT Hot!



FIRE PILOT CONTROL



SAMPSEL THERMOSTATS



ATTIC FAN CONTROL

SAMPSEL Controls enhance the sales appeal of the finest heating and conditioning equipment. They provide the eye-appeal and promise of service that SELLS a unit — they deliver in a manner that keeps that unit SOLD. Write for a descriptive bulletin on any or all controls shown.

Five types. Sizes to control installations from the smallest domestic to the largest commercial stoker. Easily installed. Features include: Fused entrance s witch, heavy duty type relay and transformer. Silver contact points on trolley arms and relay. Bakelite junction block. Dial that indicates correct operation. One, two or four cycles per hour. Underwriters' Approved. All parts enclosed in steel housing.

Featuring shock-proof, cream plastic housing. "A"—The Protectolite Thermostat — flashes a red signal when for any reason the stoker ceases to operate properly. "B" — The Standard Thermostat — is available with or without wall base; has full temperature range of 50° to 90°. "C" — The Day-Night Clock Thermostat — contains two elements; one controlling day temperature; the other night. Automatically switches from day to night to day temperature at a predetermined time.

Can be set to automatically operate the attic fan for any desired period for any duration of time. Used with thermostat it will operate automatically on any temperature rise and fall. Can be manually operated by throwing switch on side of clock. Ivory plastic clock case has "eye-appeal" for home owners. Unsightly cords and switches completely eliminated.

Three-in-one control with wiring combinations that adapt it to low or line voltage limit control operation or line voltage fan control operation. Provides an adjustable differential of 10° to 90°. Adaptable for complete range of handired furnaces, stoker, oil burner and gas burner installations — with or without blowers and air conditioning equipment. Write for information on the complete line of Sampsel Controls.

For hand-fired steam and hot water boiler and warm air furnaces. Maintains heat within two degrees constant temperature. For installation with either Day-Night Clock or Standard Sampsel Thermostat. Packed complete with built in transformer, wire, chains, pulleys, etc., and complete instructions for installation. Has potential market of approximately 91/2 million U. S. homes.

Comprised of combination relay and transformer (right) and two-wire low voltage thermostat. Provides for installation close to unit heater — reducing to a minimum the high voltage wiring needed. Heavy duty transformer will hold low voltage regardless of line fluctuation. Heavy duty relay will function properly under varying voltage conditions. Write for bulletin.



DAMPER MOTOR CONTROL



WARM AIR FURNACE CONTROL



UNIT HEATER CONTROL

SAMPSEL TIME CONTROL, INC.
SPRING VALLEY, ILLINOIS



Profit-Minded Men Everywhere are Taking on the "Profit Line" . . . HOMER

In this day and age of keen competition and demand for heating and every type of air-conditioning equipment it is important to have a source of supply that you can depend upon for every requirement. We are now offering our customers the finest, most up-to-date and complete line of heating and air-conditioning equipment in our history. To supplement this line and make it even more profitable to you, we manufacture and stock a complete line of repairs.

#### ONE SOURCE!

Round and Square Casings
Round and Square Duct Fittings

"TEN HUNDRED" SERIES
FURNACE
with Homer Stoker and e
Homer DoLuxa Blower-Pitter

WARM AIR FURNACES (Cast and Steel)

OIL-BURNING FURNACES

STOKERS • BLOWERS • FILTERS

CONTROLS

#### MANUFACTURERS OF FINE HEATING EQUIPMENT Continuously—For Almost a Third of a Century!

The Homer Furnace & Foundry Corporation was established in 1909 and has been manufacturing highest quality heating equipment continuously ever since . . . Pioneers in the warm air heating industry, we have achieved an enviable record in the development and perfection of the modern furnace and, in later years, the air-conditioning equipment that has gone so far toward making the American home the envy of the entire world . . . Straightline manufacturing methods in our large, modern plant located in the center of industrial America allows us to give our customers sound engineering, highest quality merchandise and practically twenty-four hour delivery at a price to meet the average home owner's pocket book. Homer wishes an opportunity to serve you. We are positive of your satisfaction.



#### HOMER

Sure-Profit Program

- 1 Complete Heating Equipment Line
- 2 Dealer Help Program
- 3 Exclusive Franchise



HOMER
"ROUND" GRAVITY
FURNACE

HOMER FURNACE & FOUNDRY CORP.

Coldwater, Michigan, U.S.A.

# AIR CONTROL offers for

A COMPLETE LINE



No. 20 GRAVITY TYPE REGISTERS offer modern styling; ample free area, for gravity installations, and are adjustable for forced air. A universal register—ideal for new gravity installations or for converted forced air installations. Self-sealing sponge rubber gasket, supplied on all registers, makes an air tight seal between wall and register. Beautiful Metalescent Finish furnished as standard. Also available in sidewall types.

No. 41 FLOOR REGISTERS match in appearance and construction the No. 40 Faces. A new shallow valve mechanism is also ideal for sidewall installations. When closed the valve is close to frets—making it easy to clean without removing from floor. Their many superior features make this new line an exceptional value.

No. 40 RETURN AIR FACES a new line of floor faces of grid type construction. A new medium mesh (9/16" x 1-15/16") is heel-proof yet has adequate free area. Priced the same as ordinary wide mesh faces it eliminates the necessity of using two meshes. Construction is exceptionally rigid and frets are made from heavy gauge material. Finishes are Infra-Red baked, assuring lasting attractiveness.

ATTIC LOUVERS for attic ventilation and DAMPER CONTROL SETS for forced air dampers are also included in the complete AIR CONTROL Line.

Standardize on AIR CONTROL for 1941. Write now for complete catalogs.

AIR CONTROL PRODUCTS, INC.
MUSKEGON MICHIGAN

# MASS PRODUCTION COMES TO THE AIR CONDITIONING FIELD

TO GIVE YOU THESE NEW FLUID HEAT UNITS PRICED TO SELL TO THE SMALLER HOMES

#### Oil Burner Pioneer Again Sets Pace With New FHA Type Air Conditioners

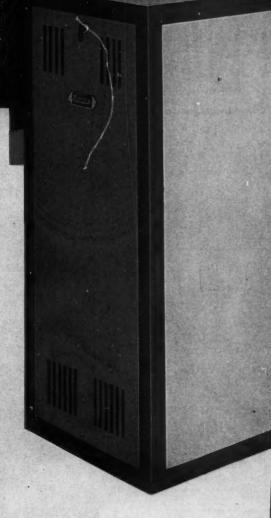
With the introduction of the Fluid Heat FHA Type Air Conditioners, Fluid Heat has taken high quality Air Conditioning equipment out of the luxury class and made it available to practically every builder of a small home throughout the country. To do this, Fluid Heat, after years of Burner and Furnace manufacturing, has installed a completely modern mass-production line to build FHA Units complete from special steel plates direct from steel mills into finished burner-furnace units.

Today Fluid Heat Dealers everywhere, with the new FHA Air Conditioners added to the famous complete Fluid Heat line of home-heating equipment, are cashing in in a big way on the trend to low-cost, effective, complete winter Air Conditioning.

The FHA Units are marvels of the economy of mass-production. Quality-built, with savings made in manufacturing instead of in materials, they offer many firsts—and many finer features—not found on other Air Conditioners costing much more. The burner and furnace are engineered as a Unit—not put together as a make-shift. The jackets and burners are finished in "hammered" gray baked by the Infra-Red method. The Burner is approved for firing rates of 7/10 to 3 G.P.H. by Underwriters Laboratories under U. S. Commercial Standards CS75-39. Capacities from 80,000 to 215,000 B.T.U. at bonnet.

#### A Complete Line of Home-Heating Equipment

4 Pressure Burners, 6 Rotary Burners, 1 Domestic Hot Water Heater, 7 Winter Air Conditioning Units, 3 Burner-Boiler Units.



## CHECK THESE SPECIAL FEATURES

- √ Special Factory-Built Combustion Chamber.
- √ Economical, Quiet Fluid Heat Oil Burner.
- √ Observation Port.
- √ Heavy Steel Plate Furnace.
- VEfficient Insulation.
- √Combination Fan and Limit Control.
- √ Clean-Out Opening.
- √ Spun Glass Filters.
- √ Quiet Blower of Ample Capacity.



Electrically Welded Furnaces, built completely by craftsmen in the modern Fluid Heat factory, reduce costs, permit unit mass manufacture.



New Infra-Red Ray Dryer which bakes the enamel on Fluid Heat Air Conditioner jackets, one of the few such units in the country today.



Homes as Small as These are now prospects for Air Conditioning when you sell the new Fluid Heat FHA Type Air Conditioners.

AIR CONDITIONER

"World's Economy Champion"

PRODUCT OF THE ANCHOR POST FENCE COMPANY

Fluid Heat Division, Anchor Post Fence Co.
6726 Eastern Avenue, Baltimore, Maryland.
Please send me at once details of the Fluid Heat Air Conditioners and the complete Fluid Heat Line.

Name....

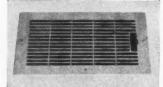
Firm.

Address......State.....

#### A NEW REGISTER







BETTER PERFORMANCE AT LOW LIST PRICE.

DETAILS OF THEN MAN' SHUTTER

Depth Closed 'W' at top and bottom, 'W' at side of Handle.

Depth Closed I'' at lop and bottom, 'W' at side of Handle.

Ment have 32 Mar 1 57/38 - W' best No. 16 Gauge Steel.

Depth Copend I'' at lop and bottom, "I' at side of Handle.

#### ECONOMY

NOMY
Note new low List Price.
New Swivel Socket Lug permits omission of Frames. [Patent Pending].

PERFORMANCE
From closed position the air stream may be graduated over a radius of 135°, that is, directed down, straight or up. Also note the STOP Points.

Points.

THE FACE

The Face is removable, permitting easy and secure anchorage of shutter for streak-proof installation, also for painting wall or redecorating. Sponge subber gaskets are supplied.

THE SHUTTER

The Shutter is shallow Multiple Value type, aliminating the object.

IOTIER

Multiple Valve type, eliminating the objectionable single blade or flapper. It has positive cam leverage operation it is strongly built.

#### BRASS BEARINGS

Moving parts rotate on Brass bearings to minimize rust and clogging.

THE SWIVEL SOCKET LUG (Pases Pending)

By use of this new device Metal Frames can be omitted. Wood

Screws are furnished for anchoring shutter to stud or buck. Parker

Screws are also furnished for anchorings to duct or stame if present.

The new Swivel Secket Lug permits anchoring-screws to set at an

angle.

#### STOP POINTS

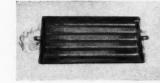
FORM'S for equalization and control of the heating system the shutter may be set, if desired, to stop at four points as follows: First Stop curtails air flow for use on short runs. Second Stop gives dewaward deflection. Third Stop gives straight throw, fourth stop upward throw.

The Stop, when used by the installer, is out of reach and is adjustable only with a No. 1 Phillips Head Screwdrives—therefore it cannot easily be tampered with.

When shipped, stop will be set in No. 4 position permitting complete 135° swing of louvres. An envelope will accompany each Register containing 2—11/2" No. 8 Flathead



THE SHUTTERS IN DETAIL



THIN MAN SHUTTER attached to WX Frame

The FACE may be applied at any time after THIN MAN SHUTTER is attached, thus permitting painting or papering of the wall without hinderance of the Face. All necessary screws are furnished with each Register

#### DETAILS OF FOUR STOP POINTS







#### WROUGHT STEEL MULTIPLE VALVE "THIN MAN"

#### REGISTERS FOR RESIDENTIAL USE

Write AT ONCE for full information regarding this NEW REGISTER.

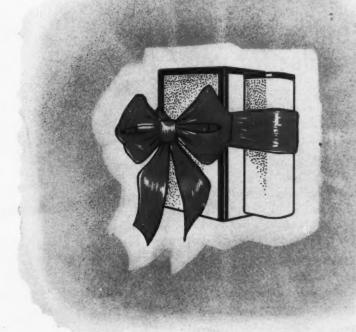
#### REGISTER & GRILLE MANUFACTURING CO., Inc. 70 BERRY STREET BROOKLYN, N. Y.

JAMES H. BAILEY, President TROWBRIDGE A. WARNER, Vice Pres. Chg. of Sales RUSSELL T. BAILEY, Director

BRUCE R. TUTTLE, General Counsel CLIFFORD D. BAILEY, Secretary EDWARD F. BLOM, Director

FRANK T. BAILEY, Vice President ALFRED L. TUTTLE, Treasurer ERIC D. MOLLANDER, Director

## Good things in



## Small Packages



#### AUTOMATIC FURNACES

FOR OIL

FOR GAS

### J. V. PATTEN CO., INC.

200 DEKALB AVENUE

SYCAMORE, ILLINOIS



Basement Units employ counterflow principle of heat transfer. Vent outlet and cleanouts at rear. Blower-filter assembly mounts under economizer assembly. Burner in full vestibule.

Utility Room Units employ pull-through principle of heat transfer. Blowers are top-mounted and return air is taken at floor level. Burner installs under econo-



mizer assembly. Vent outlet and cleanout in front of unit. Adaptable to closet installations.

Space Heater Units same as Utility Room Type with added reversible outlet turrets and directional flow air conditioning grilles. Entire unit self-contained including thermostat.



#### **Swartwout Ventilators** have business-getting features that make more sales for you!

HERE are three types of ventilators which have real selling features - quality products backed by Swartwout's more than 30 years experience - ventilators that you can handle with more speed, less trouble and greater profit to you....

THE SWARTWOUT AIRJECTOR combines low-cost power air movement, gravity flow and wind suction effect. You can recommend it as a highly efficient power ventilator, unusually effective because of its rotary head.

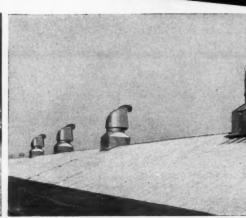
THE SWARTWOUT-DEXTER HEAT VALVE is the original continuous roof ventilator that gives your customers more square feet of opening per dollar invested and a neat appearing job they're proud of.

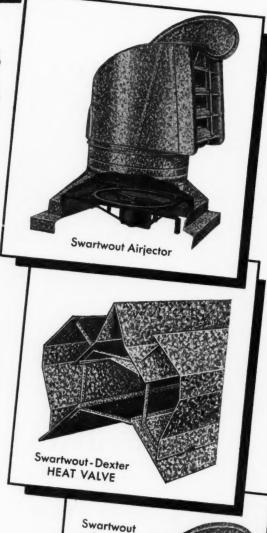
THE SWARTWOUT ROTARY is a scientifically designed improvement of industry's favorite type ventilator. Has large capacity per size of ventilator due to its outstanding design features.

When you recommend Swartwout Ventilators you know your customers will be satisfied and you boost your reputation for high grade workmanship. Contractors are installing thousands all over the country. Write today for full information.

THE SWARTWOUT COMPANY 18615 Euclid Ave., Cleveland, Ohio

# ENTILATION SPECIALISTS







Rotary



#### Aldrich HEAT-PAK Fuel Pump.. with lightning-fast NOZZLE VALVE Cut-Off!

Look to Aldrich to lead the industry! Now fuel units are eliminated - and with them go a major part of the expensive field servicing that eats up your profits! Aldrich's simple pump arrangement has fewer parts - insures new quietness, efficiency and economy of operation. It does the job of a fuel unit better with none of a fuel unit's disadvantages. You'll want to know all about it. Send coupon today.



"I want coupons from oll burner dealers who are interested in KEEP-ING their profits".

ALDRICH COMPANY WYOMING, ILLINOIS

Rush me full information on the new HEAT.

PAK Oil pump and the Aldrich oil burner and oil-fired Boiler and Water Heater line.

ADDRESS CITY.

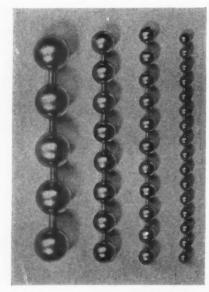
STATE.

#### **Due to Nozzie Trouble**

- LIQUID COOLED circulating fuel cools the

ALDRICH COMPANY WYOMING, ILLINOIS

## BEAD CHAIN



No. 20 No. 13 No. 10 No. 6
BEAD BEAD BEAD BEAD
CHAIN CHAIN CHAIN

Illustrations Actual Size Samples on Request

Size No.	Dia. of Bead Approx. Tensile in Inches Strength in pounds	
6	.125	25-30
10	.187	45-50
13	.250	85-100
20	375	175-200

#### **MATERIALS**

Brass, Bronze, Gilding Metal, "Monel" Metal, Nickel Silver, Aluminum; Chromium, Nickel. Standard attachments as shown, or made to customers' specifications.

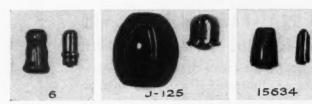
BEAD CHAIN\* cannot kink nor tangle. Its swiveling characteristics make it advantageous for regulators and controls with sheet metal fixtures and installations.

BEAD CHAIN\* is most practical for automatic regulation of dampers and ventilators. Specially designed sprockets insure smooth operation

BEAD CHAIN\* may be had in bulk and cut lengths, with couplings and attachments, or in assemblies to meet the specifications of the manufacturer.

BEAD CHAIN\* engineering service is prepared to cooperate fully with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

#### **DETACHABLE PENDANTS**



#### NON-DETACHABLE PENDANTS

#### COUPLINGS





#### CHAIN AND CORD COUPLING (Actual size)

This coupling, No. 10-V, makes a firm detachable connection between BEAD CHAIN and Venetian blind or sash cord. It is easily applied. For No. 10 BEAD CHAIN only.

\*Trade Mark Reg. U. S. Pat. Off.



Trade Mark Reg. U.S. Pat. Off

THE BEAD CHAIN MANUFACTURING CO.

BRIDGEPORT CONNECTICUT



# 70 th anniversary Values



SPX STOKER FURNACE—a new stoker furnace with side extensions for stoker on either left or right; the Round Oak than the average stoker furnace. Complete with Round Oak winter air conditioning equipment. Either the Round Oak shown, or any other standard stoker may be used.



X-B OIL FURNACE—a new, compact unit that performs all the functions of heating and winter air conditionings. High operating efficiency; low operating costs. A real quality package at a price that opens new markets for Round Oak dealers.



BLENDED-IRON FURNACE—a Blended-Iron gravity unit famous for quality and superior features. The only cast iron furnace with the diamond shaped radiator.



CHIEFTAN STEEL FURNACE—a new, rivered and welded gravity new, rivered and welded gravity furnace built for years of trouble-free and economical service. Now offered in several sizes.



L BLENDED-IRON FURNACE -L BLEMBEU-INON FURNAUE another fast-selling gravity fur-nace of Round Oak Blended-Iron construction. An outstanding leader in your big volume market.

COAL, GAS, OIL, ELECTRIC AND GAS COMBINATIONS



Seminole 2-oven combination range. Electricity for summer cooking ... coal or wood for winter cooking and heating.





Ottawa coal range is streamlined in design, practical and depend-able. A great Round Oak range value; a fast seller.

OUND OUT with ROUND OAK

CUT YOUR ANNIVERSARY MELON-MAIL COUPON TODAY

Round Oak Company, Dowagiac, Michigan
Send at once the complete story on your 70th Anniversary
line for 1941. I am interested in: 

| Heating Equipment, |
| Ranges, | Both.

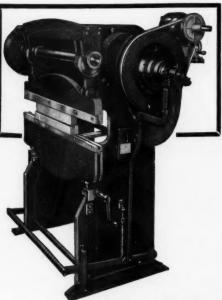
Address\_\_\_

# MODERNIZE YOUR SHOP WITH CHICAGO EQUIPMENT

It's no secret that the Sheet Metal Shop equipped with modern time-saving equipment makes more profit and turns out far better work. Dependable, efficient tools from Dreis & Krump will put your shop in the running with the best of them. Illustrated is the compact, ruggedly built, 48", No. 14 gauge capacity, Chicago Steel Press brake. It is ideally adapted for rapidly forming metal sections;

such as, in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, etc. It can easily do 40% to 60% of the forming work turned out by the average shop. Variable speed drive operates from 17 to 50 strokes per minute. A quality item that no truly modern shop can afford to be without.

Also made in 40 larger sizes up to 16 ft. to bend  $\frac{1}{2}$ " plate.



CHICAGO STEEL PRESS NUMBER TWO FIFTY THREE



#### CHICAGO STEEL BRAKE

Here is a brake manufactured for any and all types of bending. Made in 35 standard sizes for up-to-date sheet metal shops. We also build special brakes for difficult jobs. Consult us before you equip your shop with production machinery. We'll show you how Dreis and Krump items will save you time, money and worry. Best by test for over 40 years.

#### PORTABLE CHICAGO STEEL BENDING BRAKE



This portable brake was built to fill a definite need in air conditioning work—will bend and flatten  $^{1}\!\!/_{4}$  in. or wider seam on 22 gauge; will bend  $^{1}\!\!/_{2}$  in. flange or wider on 20 gauge—half the weight of regular brake, perfect for use on small or large jobs and ideal for general shop use. Legs swing up and make very compact piece to carry to the job. Clamping handles are made to be used for carrying.



Top and bottom sections of one-piece embossed steel plates for greater strength with minimum weight. Bending lead is a solid plate reinforced with specially formed plate. One man can set it up by bringing hinged legs to upright position and locking with convenient thumb screws. Two men can carry it. No loose parts to mislay. Brake always remains firmly in place without bolting to floor.



Catalog on request . . . WriteToday!

DREIS & KRUMP MANUFACTURING CO.
7404 LOOMIS BOULEVARD CHICAGO, ILLINOIS

# **FURNACES**

# ICTOR HEAT RADIATING FINS

PATENTED, EXCLUSIVE, FIN-RADIATION increases heating efficiency 20 per cent or more. These Heat radiating fins absorb and utilize the radiant heat which is wasted in furnaces of ordinary design. The air is warmed to much higher temperatures, resulting in greatly increased air circulation and insuring a positive flow of heat to every

FURNACE-BODY is heavy boiler-plate steel, welded and also riveted where heat strains are greatest. Eliminates expensive resetting.

BIG BOILER-PLATE ECONOMIZER (radiator) welded throughout. Smoke-tight, dusttight, gas-tight.

WATER COIL placed above feed door, out of way when firing, more effective and lasts longer since sharp bends are eliminated.

LARGE FEED DOOR makes refuel-

HOT BLAST SMOKE CONSUMER provides super-heated oxygen for better combustion. Reduces smoke and saves fuel.

WAIST-HIGH SHAKER HANDLE moves grates easily and quietly on wheel bearings.

DOOR HANDLES always cool. Insulated against over-heating.

> DAMPER CONTROL automatically provides direct draft when feed door is opened. Eliminates smoking through feed door opening when refueling. Damper closes by gravity when feed door is closed. A patented exclusive Hall-Neal feature.

> > LARGE ROOMY HOOD promotes good heat distribution to all warm-air pipe take-offs.

BIG ASH PIT DOOR EDGES OF DOORS permits easy ground to air-tight fit. Gives accurate control ash removal.

AUTOMATIC VAPORIZER SEPARATION OF POUCHES of stainless steel gives constant, improves air circulation inside rapid evaporation. Proper casing-increases heating surfaces hamidity promotes better -reduces heat losses through front.

> PATENTED CASING connections are dust, gas and smoke tight. Easily removed when desired. Front panel sections allow for expansion and contraction of furnace.

LARGE ECONOMIZER built with three flues for controlled effective fire travel. Provides more perfect combustion. Reduces smoke pipe and chimney losses. Insures more heat for the home.

> CLEAN OUT DOOR is easily accessible without removing smoke pipe.

ECONOMIZER bottom is double thickness, assuring lifetime of service.

FIRE BRICK LINING made to withstand intense heat (3050 degrees F.) makes ideal Firepot of unusual depth. No expensive castings to crack or burn out.

STRONG, FLAT GRATE has draw center for easy clinker removal. Note fingers on grate which insure proper combustion by keeping sides of Firepot free from ashes.

DEEP, ROOMY ASH PIT protects against grate damage -makes frequent ash removal

HEAVY, ONE-PIECE BASE RING of T-iron makes rigid, indestructible foundation, insuring perfect alignment of all parts. Supports entire furnace 14 inches above floor. An exclusive, patented Hall-Neal feature,

JOOD HEATING equipment capably engineered, carefully manufactured, properly installed, and intelligently serviced—is about the greatest satisfaction that can be built into a home. As a Hall-Neal Victor dealer you can offer all of this. Do not be satisfied with less! For better profits from your territory write us for full information—today!

VENTHATION SPACE

under ash pit bottom allows

circulated air to pick up heat

otherwise lost through base-

ment floor

VICTOR STEEL FURNACES VICTOR CAST FURNACES

VICTOROIL OIL UNITS **VICTORGAS GAS UNITS** VICTORSTOKE STOKER UNITS

A complete line of heating equipment.



HALL-NEAL FURNACE CO. INDIANAPOLIS



# Pliavane THE REGISTER THAT COMBINES PRICE with QUALITY

uality built by Tuttle & Bailey the Pliavane Register scientifically constructed for all air conditioning d forced air installations. It is an ideal register on which to standardize — good looking and urdy for your high-class jobs and priced so that can be used in the most competitive of low cost using developments. You can stock the Pliavane two different constructions to meet every condition u encounter. A conventional single-valve model th horizontal face vanes allows for instantaneous justment of the air stream up and down. The mous Adjustiblade Pliavane with vertical face nes allows for sidewise deflection of the air path lile an ingenious series of back blades, adjustable m the face of the register gives you up and down flection at the same time. When you install the justiblade Pliavane you can easily solve the most ublesome problem of air deflection.

Pliavane Return Air Intake is also available with ther vertical or horizontal face vanes so that your tole installation will be harmonious.

of so long ago you thought of scientifically correct ir Conditioning Registers as too expensive for low ast installations—Pliavane has changed all that!

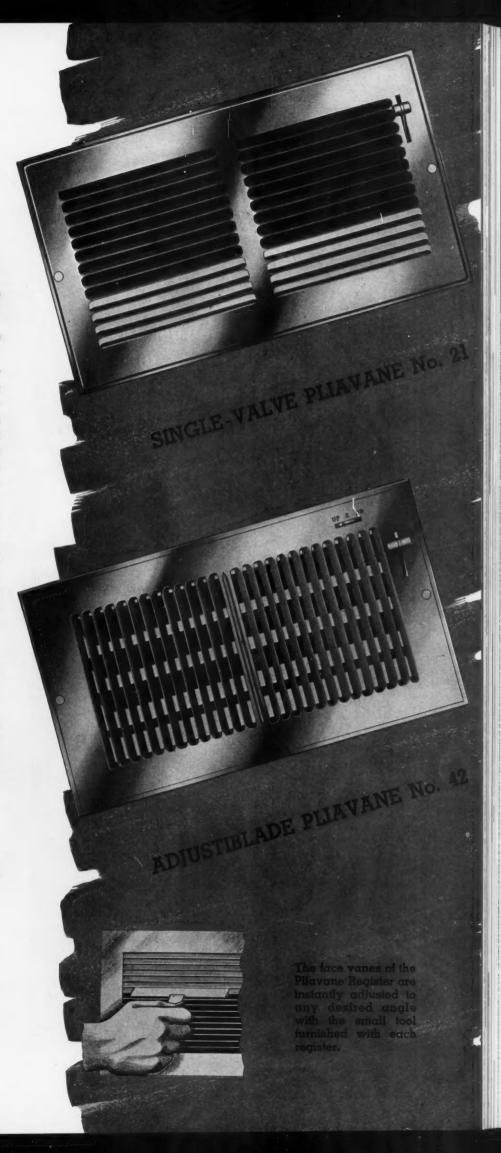
An Ideal Register Upon Which To Standardize"

OTTLE &
AILEY, INC.



NEW BRITAIN, CONN.

New York Philadelphia Chicago







# 48/3 TONS OF WATER...

### PER SQUARE FOOT OF DUCT PER YEAR

That's why air conditioning jobs need the corrosion resistance of Youngstown's Galvanized Sheets.

No one regrets the passing of the old hot air jobs--but they had one advantage--the air in them was practically bonedry and virtually non-corrosive to duct work. Modern air conditioning has increased the corrosion problem in sheet metal ducts many times.

Because your reputation depends on the service your duct jobs give, you will need the quality that Youngstown builds into every Youngstown Galvanized Sheet. Made by expert steel men, the base metal in Youngstown's Galvanized Sheets is outstanding for its uniform ductility. In the galvanizing process, Youngstown's modern manufacturing procedures assure a positive adherence and a uniform thickness of corrosion-resistant

Youngstown Sheets not only offer a solid wall of zinc to resist corrosion but their uniform workability helps your men to faster time and better workmanship.

★This figure is based on a normal cooling job with air leaving the coils at 85% saturation -- 55° dry bulb temperature, 4.7 grains moisture per cubic foot of air and duct velocities averaging 1000 f. p. m. -- for 8 hours a day and 300 working days per year.

10-11C

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels

Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

## **EXCELSIOR WARM AIR HEATING EQUIPMENT**

EXCELSIOR WARM AIR FURNACES—GRAVITY TYPE



Steel. Four sizes, rated 390 to 683 sq. in. warm air pipe capacity. A high-grade Furnace priced extremely low.



Cast iron. Made in six sizes, rated 336 to 871 sq. in. warm air pipe capacity. SUPERLIFE Chrome-alloy cast iron of similar design with 20 year guarantee.



Cast iron. Made in three sizes, rated 595 to 843 sq. in. warm air pipe capacity.

Greatly increased heat radiating surfaces.



TOP-NOTCH

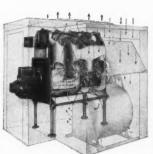
Steel. Six sizes, rated 464 to 1217 sq. in. warm air pipe capacity. The very latest in steel furnace design.

#### **EXCELSIOR AIR CONDITIONING UNITS**



APEX EXL-AIR

Attractively cased with blower housing on either side. Made in three sizes, rated from 83,500 to 124,000 Esc, rated from 83,500 CFM. Steel construction. Economical in operation.



UNIQUE OIL BURNING AIR CONDITIONER

Cast iron Heating Element provides greater radiating surfaces with in-creased heating efficiency.

Made in five sizes:

C2-75,000 Btu. 800 to 1500 CFM.

-100,000 Btu. 800 to 2100 CFM.

-121,000 Btu. 1220 to 2500 CFM.

C5-141,000 Btu. 1220 to 2500 CFM. -161,000 Btu. 1100 to 3200 CFM.

Unequalled for economy, heating efficiency and quietness.



TOP NOTCH EXL-AIR

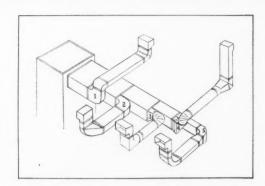
Complete winter air conditioning unit. Three sizes, rated from \$8,000 to 141,300 Btu. and 800 to 2500 CFM. Casing is fully baffled for uniform heating.

#### EXCELSIOR PREFABRICATED FORCED AIR DUCTS AND FITTINGS



APEX OIL BURNING UNIT

Standard burner in specially designed steel heater. Three sizes rated at 93,000 to 142,000 Btu. Cast iron combustion chamber, refractory lined, simplifies installation.



A simplified duct system for forced air and air conditioning installations. Our No. 7 catalog, with our combined Code and Manual explain the ease with which Trunks and branches can be designed and installed.



FAMOUS EXL-AIR

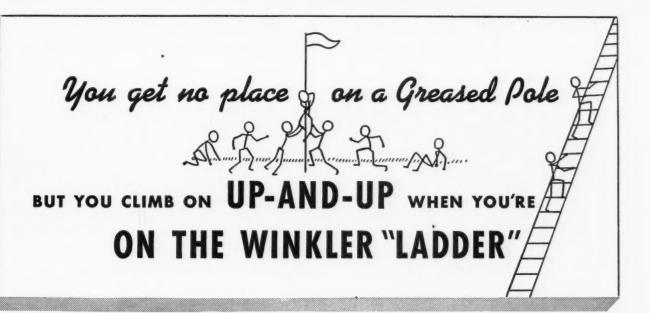
Square cased Units with blower, blower switch and automatic humiditier. Made in three sizes, rated from 111.600 to 158,700 Btu. and 800 to 3200 CFM.
Standard model permits side stoker installation.

Complete Information on All of the Above Products Upon Request

## THE EXCELSIOR STEEL FURNACE CO.

118 S. CLINTON ST.

CHICAGO, ILL.



## Consider These 3 Reasons Why Winkler Sales Keep on Climbing

Reason No. 1. Winkler sales keep on climbing because Winkler Stokers are the best. Demonstrations prove it. Yes—demonstrations and the records of users prove that Winkler's rugged construction and greater efficiency mean dependability and long life. People buy Winkler Stokers on their own good judgment, when they see a demonstration. And more than twice as many people bought Winklers last year as the year before. But that's only part of the story of Winkler's nation-wide sales success. Winkler sales have more than doubled the previous year's sales—every year for years.

Reason No. 2. Winkler sales keep on climbing because Winkler Stokers are priced right. They cost less

than others, when you consider Winkler efficiency of design and construction. And the Winkler line is complete—including binfeed and hopper models up to 800 pounds per hour. Winkler's mass production facilities and the direct-from-factory-to-merchant franchise give Winkler merchants and their customers definite advantages.

Reason No. 3. Winkler sales keep on climbing because of Winkler engineering and sales service. Winkler distributors are furnished the most practical, aggressive and modern methods to build more sales and give better service. A large group of factory trained sales engineers cover the nation—and a competent, prompt, factory engineering department backs up the field force.

ARCHITECTS—You please your clients when you specify Winkler Stokers—because of the user satisfaction these better stokers give. Architects specify Winklers with confidence—because Winklers are always dependable, backed by a strong company. They bring you praise for good judgment. Write for architect's manual.

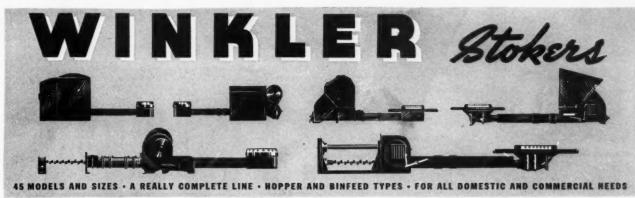
ENGINEERS—Once you see a Winkler demonstration you'll be on the Winkler "ladder" as a sales booster. Why? Because you'll recognize the mechanical efficiency built into these better stokers—the design and construction which mean long life, low operating cost and dependable service year after year. Write for engineer's manual.

CONTRACTORS—There's a Winkler Stoker for every type of building—and for every "pricestep" up the sales "ladder." Winkler distributors are everywhere. Recommend Winklers and you'll make more warm friends. The user satisfaction Winklers give is an asset to all who boost these better stokers. Write for full information.

STOKER MERCHANDISERS...It will pay you to get on the Winkler "ladder." Investigate this better stoker sales opportunity.

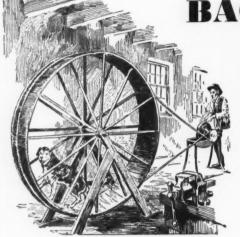
U. S. MACHINE CORPORATION \* LEBANON, INDIANA





# WISS Famous Since 1848....





The Celebrated Wiss Snips were forged by hand in Newark, New Jersey, by the founder of the Company, Jacob Wiss, and sharpened on a grinding stone driven by a dog power tread mill. So well were these snips made that some of them were still in use after a half century of service.

## 1941

Today the factories of J. Wiss & Sons Co., are the largest of their kind in the world—the principal reason for their growth being firm adherence to the policy of the original Jacob Wiss—to only turn out goods of the highest quality.

#### TODAY - WISS SNIPS ARE KNOWN TH

—Best by Actual Test—

PRECISION GROUND — ACCURATELY TEMPERED—FACTORY TESTED

"HIGH-POWER" SNIPS WILL CUT TOUGH ALLOY METALS



WISS SCROLL-PIVOTER SNIPS

Wiss "High Power" Snips





COMBINATION PATTERN



CURVED BLADE PATTERN

SEND FOR PARTICULARS OF COMPLETE LINE OF TINNERS' SNIPS

J. WISS & SONS CO. **NEWARK.** 

STILL GOING BY LEAPS AND BOUNDS!

When a line of heating equipment has consistently shown the tremendous gain in acceptance that Janitrol has enjoyed during the past year, you can just bet your bottom dollar that merit has rightfully taken "front and center"...and there's always room for more dealers with vision and sound selling tactics . .

JANITROL WINTER AIR FAC CONDITIONERS

JANITROL GAC GRAVITY FURNACES

> JANITROL UNIT HEATERS

JANITROL ATTIC INSTALLED BLOWER UNIT

GAS-FIRED

SURFACE COMBUSTION CORPORATION . TOLEDO, OHIO

PROFIT PARADE



Reading time: 1 minute, 5 seconds

"In 1908, I started out in the sheet metal trade as a helper. Since then I have worked on the outside and the inside as a mechanic, estimator, foreman and a boss. Now I have my own business.

Iron-and tells you why in his statement below.

"Through the years, Toncan Iron has been my choice. That's because it works easier on the bench, lasts longer and is a better buy for my customers.

"I soon realized that metal has something to do with costs and profits, too—because the reputation of a shop has more to do with building customer confidence than anything else. And you build confidence by giving every customer the best job for his money.

"I like to think that people say something like this about

me: 'Call in Charlie Blouin. He does first class work, and I have faith in his recommendations.'

"At least, that is the way hundreds of jobs have come to me so far. I have been in business for myself for seven years, and have done quite a few thousand dollars worth of sheet metal work, specializing in ventilating, air-conditioning, new construction and smoke breechings.

"I have complete confidence in Toncan Iron, and regard it much as one regards an old friend. In fact, when an architect or an engineer asks me for a recommendation on metal, I tell him that Toncan Iron is his best betbecause at a very slightly higher original cost, he can have an installation that will last years longer and will save early replacement costs."

Why not try Republic Toncan Iron in your sheet metal work? It can help you just as it helps Mr. Blouin and other leading sheet metal contractors. Write us for literature—and the name of your nearest Toncan Iron distributor.

#### REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

BERGER MANUFACTURING DIV.

CULVERT DIVISION

NILES STEEL PRODUCTS DIVISION

STEEL AND TUBES DIVISION

UNION DRAWN STEEL DIVISION

TRUSCON STEEL COMPANY





# REPUBLIC TONCAN IRON

An alloy of refined open-hearth iron, copper and molybdenum—that grows old slowly

Vol. 110

and

e to

even

orth

con-

gard

n an

tion

oet-

can

will

netal

other

ature

utor.

N

owly

# Gmerican ERTISAN

No. I

### 1940 Broke Most Records

1940 was a record breaking year for the production and sale of many American products. Sales of some products established new, all-time highs, while many others enjoyed the greatest sales volume since 1929.

In the products and services bought, sold and installed by our own industry, 1940 exceeded all past volume in many items or very nearly equals any records previously established.

Warm Air Furnaces

As for unit figures of production and installation of warm air furnaces, in the weighted judgment of men throughout the industry there were sold in 1940 at least 525,000 furnaces of all types.

By dollar volume the Department of Commerce has reported, for 118 manufacturers, for the first three quarters of 1940, total sales of "Warm air furnaces, winter air conditioning systems and accessory equipment"—\$25,550,772. The Department breaks this sum down as follows:

Complete winter air conditioning units including warm air furnace, blower, air cleaner, humidifier and control equipment—

Cast iron furnace—Coal fired\$	1 802 272
Cast iron furnace—Gas fired	
Cast iron furnace—Oil fired	
Steel furnace—Coal fired	924,875
Steel furnace—Gas fired	2,091,580
Steel furnace—Oil fired	2,711,106

\$10,497,861

Warm air furnaces (gravity air flow), shipped separately—

or par acces	
Cast iron furnace—Coal fired	\$11,285,947
Cast iron furnace—Gas fired	602,054
Cast iron furnace—Oil fired .	
Steel furnace—Coal fired	
Steel furnace—Gas fired	
Steel furnace—Oil fired	125,247

\$15,052,911

There can be numerous interesting interpretations of these figures. For instance, gravity air flow, cast iron, coal-fired furnaces sold to 11/25ths of the total in the first three quarters and probably maintained this ratio throughout the year.

Oil-fired and gas-fired cast iron and steel furnaces for gravity installation did not do very well. Undoubtedly the answer is that when the owner goes to automatic heat he also wants all the extra benefits of blower circulation, air cleaning, controls, etc., and thus buys a winter air conditioning unit. All types of winter air conditioning units—cast and steel; coal, oil, gas, showed substantial increases over the same period of 1939.

#### **New House Construction**

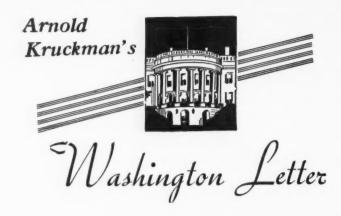
Where did all these furnaces go? First, of course, into new houses of which (including one-, two-, and multi-family units) it is estimated some 500,000 units were completed in 1940. Of these 500,000 units, it is said that at least 400,000 were one-family dwellings, 25,000 two-family and 75,000 multi-family structures. This is not America's biggest house building year, but it is the largest year in the last decade. New house construction must have taken at least 325,000 furnaces.

Secondly, into replacements of existing heating plants. On this point FHA has published some very interesting data. FHA has reported that under Title 1—"the number of loans reported in 1940 did not quite equal the 262,933 loans of 1935" (when items like washing machines were available for insurance of purchase) "but the average loan in 1940 was \$405 as compared with \$337 in 1935."

FHA also tabulates the type and size of dwelling on which a loan was made and the particular item the loan purchased. From this tabulation some idea may be obtained of the number of heating plants replaced. The data are—

"These improvements and new construction (Title 1 low cost houses) were divided by property types as follows—Single family houses, 74.7% of total number of loans and 67.6% of total dollars borrowed; dwellings for two or more families, 13.5% of number and 17.1% by amount; commercial-industrial properties, 3.7%

(Continued on page 220)



THE Federal Government will spend \$24,135,740,636 or more in the current fiscal year which ends June 30, 1941. Mr. Morgenthau estimates that these funds will be collected as taxes from 5,367,580 persons and corporations. Very roughly that means each of the taxpayers contribute approximately \$4,600 to this colossal expense of Government.

Of course this distribution is no more real than is a Treasury estimate that each man, woman, child, rich and poor, citizen and alien, competent or incompetent, is responsible for \$183 of the annual operating expensos. There is probably more common sense in the calculation by Mr. Morgenthau's bright young men that 31% of the taxpayers live in the metropolitan areas of Chicago, Detroit, Los Angeles, New York and Philadelphia, and that they contribute 35% of the tax revenue. They have extended these figures further and report that 2,601,393 taxpayers are located in cities of 100,000 or more, and that 3,938,900 taxpayers live in cities of 10,000 and over. That leaves 1,428,680 taxpayers in the rural districts.

#### Small Business Pays Most

These statistical figures are interesting, and they may throw some light on the application of taxation to areas and groups. They also incidentally illustrate that our experts, who organize taxation, are little more definite in their thinking about the subject than many laymen. The business man may find it more clarifying to realize that over half the national income in volume originates with that vague and indeterminate group classified as small business. A Secretary of Commerce recently defined Small Business as all those who do a gross annual turnover of a million dollars or less. Others have amplified that definition by adding they employ 50 persons or less. Obviously, therefore, the small business man who constitutes 95% of the group that pay taxes pays well over half of the direct taxes. When you contemplate that startling fact, and add to the Federal taxes the State and municipal taxes, you realize why

the going has been rather tough for the small business man.

That \$24,000,000,000 plus the Federal Government is spending this fiscal year, obviously cannot be taken out of current national income. Mr. Morgenthau, in his most enthusiastic moments, anticipates he can raise only \$7,000,000,000 by taxation. He expects to get \$1,500,000,000 as corporation income tax; \$337,000,000 as excess-profits tax; \$150,000,000 as Capital Stock tax; \$600,000,000 as Social Security tax; \$1,000,000,000 as individual income tax; customs, \$350,000,000; carriers tax, \$250,000,-000; the so-called nuisance taxes (tobacco, alcohol, beverages, gifts, estates, excises, etc.) \$2,995,000,000. There are over 50 different tax classifications.

#### How We Built Up the Budget

When you analyze these exactions you readily perceive that directly and indirectly well over half the tax exactions fall upon the going business in the smaller brackets. Social Security reports that 69% of all workers on its books, approximately 20,000,000 persons, are classified as belonging to Small Business; and that just under 10,000,000 workers are employed in business units hiring from 1 to 29 persons. This constitutes over 31% of all workers on the Social Security lists.

It may interest you to know how the Government has built up that \$24,000,000,000 budget. We started last January with \$8,424,000,000 which was expected to cover practically all important regular expenses and some special military disbursements. Then, quickly, came the defense appropriations. They grossed \$12,148,921,299, and it costs us \$2,-148,921,299 to pay the carrying charges on our various national indebtedness. Now, at this time, Congress is expected to provide between 1 billion and 3 billion additional for relief and for added military expenses to be disbursed before the end of the current fiscal year.

The \$24,000,000,000 is not all cash; \$19,069,548,776 is in liquid funds, and \$4,066,191,860 is known as "authorizations," which means that Congress has authorized the executive departments to purchase and to

# Your Taxes in 1941

contract for various things on credit. This detail should enable you to understand the Budget discussions that will be launched in January. At least it should enable you to understand the subject a little more clearly. Even at the Treasury they do not appear to have the clearest understanding. No one seems to know how much money we will need to carry out next year's plans. The rush to help Britain without limitation has thrown the whole tentative schedule out of kelter. The President has proclaimed the dollar sign as "silly," and Mrs. Roosevelt has urged that we give until it hurts. The gen-

#### Defense Appropriations Only Begun

eral idea seems to be to take off the

lid and to overwhelm the Germans

with the weight of our potential

wealth.

Just what this means no one seems to know. There is some idea that we may tap the gold in those hills of Kentucky. Or use the British promise to pay for goods as a basis to issue our own money. Before this yeast of unlimited spending was introduced in Washington thinking, Mr. Roosevelt suggested that we would spend next fiscal year \$7,000,000,000 on regular Government expenses, and \$8,000,000,000 on defense.

Here in Washington we took this suggestion simply as a springboard. Without the later limitless-plan we generally assumed defense expenditures would run somewhere between \$10,000,000,000 and \$12,000,-000,000 for the year 1941-42, and that normal expenditures would run between \$7,000,000,000 and \$8,000,-To this we added \$2,000,-000,000 or \$3,000,000,000 for carrying charges of the current and prospective national debt, and probably another \$3,000,000,000 for the items that pop up during the year and are labeled emergencies or deficiencies. Thus, you will notice, usually informed sources in Washington calculated the expenditures of the next fiscal year as somewhere between \$22,000,000,000 and \$26,000,000,000, with a preference for the larger figure.

The same sources expected that the national defense program, during the 5 year period, would cost not less than \$50,000,000,000, and might run as high as \$75,000,000,000, in addition to the regular operating expenses of Government. And, as we have seen here during the past year, the regular

(Continued on page 206)

# RESIDENTIAL AIR CONDITIONING

t. ost - v. t - woe - et sd - e si

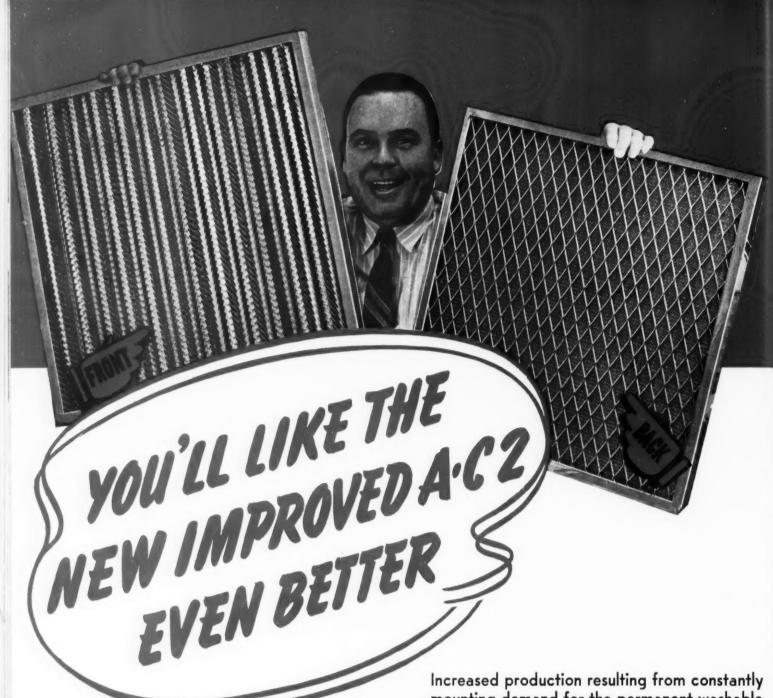
n

seef loos, s.l. e loos, dn loos, seef loos,

1



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING



Engineering data and helpful installation details are given in Bulltin No. 67. Please write for your copy. Increased production resulting from constantly mounting demand for the permanent washable type A-C2 filter, has now made it possible to include improved features of construction at no additional cost. An expanded metal reinforcement has been built into the back face of the filter to make it more rigid and sturdy; and additional layers of knitted mesh filtering media have been added to further step up its already outstanding cleaning efficiency.

The A-C Filter is designed for use in unit air conditioners and warm air conditioning units where its greater dust storage capacity, low maintenance cost, and higher cleaning efficiency make it preferred to renewable type filters.

AMERICAN AIR FILTER COMPANY, INC.

INCORPORATED

139 Central Avenue, Louisville, Kentucky



Editorial Note: This article contains a brief description of the Certified Quality Program for promoting high standards of equipment selection and installation practice which has been carried on by The Peoples Gas Light and Coke Company during the past year. It is divided into two parts: 1. A general discussion of the idea behind Certified Quality. 2. A reprint of one important part of this program, namely, the actual standards called "Information on Certified Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations," which, in a sense, is the code for equipment selection and installation practice which constitutes Certified Quality. This is reprinted with the permission of The Peoples Gas Light and Coke Company.

The remarks made in the first part of this article apply especially to the situation as it is believed to exist in Chicago.

# Certified Quality-An Insurance Policy For Better Heating Equipment and Installation

A Program for Providing the Architect, Builder,
Contractor and Owner with a Measuring Stick
for the Selection and Installation of CentralFired, Gas Heating Equipment.

Sponsored by The Peoples Gas Light and Coke Company of Chicago

By B. A. Johnson Sales Engineering Manager

HE term, Certified Quality, abbreviated CQ, applied to gas-fired, winter air conditioning, embodies a series of requirements formulated to meet a need for mutually protective specifications covering this type of equipment and its installation. Our Company has undertaken the promotion of Certified Quality in the belief that the adoption of high standards of equipment selection and installation practice will do much to continue and improve customer satisfaction for gas heating. There are several reasons why it is vitally important that the contractor, builder and architect give careful consideration to equipment and installation standards. In residential new construction where the value of a building represents an investment of \$7,000 and upward, gas is becoming more and more recognized as the universal fuel. Therefore, the problem is not one of selecting the proper fuel, but one of determining the proper equipment which uses gas and obtaining a proper installation.

In the absence of any recognized measuring stick for consumer discrimination, three distinct influences present themselves: 1. Reputable manufacturers of gas heating equipment are under constant pressure to sacrifice quality in order to lower price.

2. Skilled installation contractors are urged to lower their prices and quality of installation to meet competition.

3. The utility is put in a position of serving an increasing number of customers who use inferior equipment improperly installed.

In carrying out the Certified Quality Program, The Peoples Gas Light and Coke Company has aimed to definitely eliminate these undesirable factors by making available to the architects, contractors, builders and owners the information that is believed needed by them to assure the ultimate purchaser of, first: obtaining a heating plant that has been constructed for long life, high efficiency and fool-proof operation and properly sized for the weather conditions and the construction of the building to be heated, and, second: a heat distribution system that will supply the requirements of the various parts of the building to be heated and, third: the installation of heating plant controls and a heat distribution

tantly

shable

d fea-

nake it

tering

nding

warm

, low



General view of the equipment testing laboratory of the Peoples Gas Light & Coke Co., Chicago. Here equipment seeking the "CQ" approval is tested for conformity with the standards presented in the text of this article. All types of gas-burning devices are accepted for test by the laboratory.

system that will permit the gas-fired heating unit to deliver satisfactory service at all times.

In accomplishing this, The Peoples Gas Light and Coke Company makes available to interested parties published information on equipment and installation standards which serves as a basis for the Company's interpretation of Certified Quality; specification information and proposal forms for use by architects, builders, dealers and customers so as to facilitate the interpretation of various Certified Quality requirements; and questionnaires and guarantee certificates for both equipment and installation, as well as contact service for architects, builders and contractors.

#### Equipment Standards

As applied to equipment, CQ means that the unit selected not only has been approved by the American Gas Association and The Peoples Gas Light and Coke Company, but, in addition, also complies with the specific quality standards which are a part of the CQ requirements themselves.

Broadly speaking, this schedule of requirements includes specifications for unit efficiency and capacity; burner construction and performance; certain design limitations of combustion chambers and heat exchangers; and various requirements pertaining to valves, pilots, motors, blowers, filters, cabinets, controls and flues and their accessories. Included also are reminders that electric wiring, as part of the equipment, must be standard; that an acceptable wiring diagram be prominently displayed; that assembly instructions be furnished; and finally, that the manufacturer supplies an acceptable guarantee covering his equipment.

#### Installation Standards

The term, "CQ," as applied to installation procedure, means that system lay-out and installation comply with the quality requirements as recited in the CQ specifications, as well as complying to the minimum standards now recognized by architects, contractors' associations and national organizations, such as the National Warm Air Heating and Air Conditioning Association and the American Society of Heating and Ventilating Engineers.

The installation requirements contained in the CQ schedule are intended to apply specifically to new constructions, but should be adhered to in every way possible when gas winter air conditioning equipment is installed in old buildings.

The schedule of installation requirements are simple to understand, yet comprehensive in their adaptation to any condition. In general, they cover installation requirements for the air distribution system, controls, heating units, flue connections, electrical wiring, gas and water piping and the necessary contractors' guarantee as to the fulfillment of the specifications as contained in the CQ requirement schedule.

#### Some Typical Comments

Since this program has been adopted it has received considerable favorable comment from various manufacturers, contractors and architects in the Chicago area who have endorsed this plan, as well as arousing considerable national interest. Some of the various comments and complimentary remarks which have been received from these agencies are summarized in a few

brief statements outlined below:

Manufacturers:

"Your Certified Quality Program on gas-fired, winter air conditioning equipment merits the interest it has created. Most manufacturers and contractors prefer to make and sell a quality product, but are hindered in their preference by competitive, low-priced equipment.

"The new home buyer or builder will find in Certified Quality something concrete that he can tie to and thus be sure he receives what he pays for.

"Certified Quality, in our opinion, cannot fail because you, as a Gas Company, are interested only in the satisfaction of your customers. This situation can only be obtained by the proper installation of well-designed equipment. Your program is fair to all manufacturers and installers alike."

Architects:

ro-

laas

m-

zed

na-

rm

ion

ıti-

the

to

in

di-

gs.

are

eir

ney

lis-

on-

ing to

ned

has

om

hi-

his

nal

om-

ved

few

"The Certified Quality specifications recently brought to my office cover the requirements for a good forced warm air installation in a comprehensive manner. Adherence to this much needed standard of comparison will assure the home owner of satisfactory performance by this type of heating.

"Your efforts in promoting better quality in warm

air heating installations and the establishment of standards for good construction through Certified Quality specifications certainly meets the commendation of the architectural profession and all those interested in the improvement of this branch of the building industry.

"In any rapidly expanding field such as we find in the wide application of winter air conditioning systems in the present day, difficulties are certain to arise. Certified Quality, therefore, is very timely and definitely needed and we are pleased that this program has been initiated and promoted by The Peoples Gas Light and Coke Company."

Contractors:

We believe that the best way to exemplify the heating contractors' endorsement of this plan is to quote from a letter received from the Air Conditioning Contractors' Alliance:

"Please be advised that at a special meeting of the Alliance held Monday, February 12th, our Association went on record as endorsing the standards and requirements for "Certified Quality" installations. We desire also to extend to you our congratulations and appreciation for the work done which, we feel, will help raise the standards of this industry and promote customer satisfaction."

## Information on Certified Quality Requirements for Gas-Fired Winter Air Conditioning Equipment Installations

IN RECOGNITION of the fact that high standards of equipment specifications and installation methods are considered necessary for the continuance of the acceptance of gas as the ideal fuel for winter air conditioning, this information has been prepared to serve as a guide to architects, builders, heating contractors and dealers as to the requirements for equipment selection and installation practice which will be used by The Peoples Gas Light and Coke Company as a basis for determining whether or not new installations can be classified as having "Certified Quality."

#### Certified Quality Equipment

The term "Certified Quality," as applied to the equipment means that the unit selected not only has been approved by the American Gas Association and The Peoples Gas Light and Coke Company, but also complies with the quality requirements set forth herein. These quality factors are recognized as features which make for greater serviceability, longer life, higher efficiency and flexibility of capacity.

#### Certified Quality Installation

The term, "Certified Quality," as applied to the installation means that the system layout and installation comply with the quality requirements set forth herein as well as the minimum standards now recognized by architects, contractors' associations and national organizations, such as the National Warm Air Heating and Air Conditioning Association and American Society of Heating and Ventilating Engineers. The installation requirements contained herein are intended to apply specifically to new constructions, but should be adhered to in every way possible when gas-fired winter air conditioning equipment is installed in old buildings.

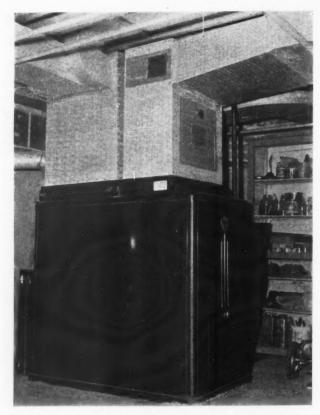
#### I-Selection of Equipment

The unit selected must be designed to furnish all of the four recognized functions of winter air conditioning, namely, controlled heat, controlled air circulation, humidity and air filtering. To meet minimum requirements, the unit must bear the seal of approval of the American Gas Association and also have the approval of The Peoples Gas Light and Coke Company's Laboratory. To meet "Certified Quality" requirements, the unit must in addition to complying with the above mentioned minimum requirements, be approved by The Peoples Gas Light and Coke Company as having reasonably conformed with the various quality features listed in the following paragraphs:

#### Serviceability and Customer Factors:

Those features that affect the ease of installation, serviceability after installation, ease of operation and adjustment by the customer and other items which affect customer satisfaction.

- Construction shall be such that the burners, mixers, main control valve, pilots and other controls are readily accessible for observation, inspection, replacement and adjustment.
- Blower and motor bearings shall be readily accessible for oiling.
- The internal flue passages shall be constructed so they are readily cleanable. Clean-out plates and doors on heat exchangers shall be constructed so that repeated removal and replacement does not impair the seal against leakage of the flue products.
- Humidifier shall be accessible for inspection, replacement and adjustment from access door or other convenient means.
- 5. All motor pulleys shall be of the adjustable type.
- All motor mountings, pulleys and belts shall be accessible for inspection, replacement and adjustment.
- 7. Filters shall be readily accessible for replacement.
- Where primary air is adjustable, the construction shall be such that the adjustments can be made when the main burners are in operation.
- The construction shall be such that the main burner flames can be observed during adjustment without disturbing draft conditions.



The two photographs on this page show typical C Q, gas-fired, winter air conditioning systems. Equipment, engineering design and installation methods conform with C Q recommendations.

- 10. All wire leads, control and motor terminals shall be identified by conventional color code.
- Solderless connections shall be used on all 110-volt motor leads.
- 12. An adequate wiring diagram shall be provided on the inspection door or inside casing of the unit.
- Solenoid valves shall not be used to operate directly on the main gas supply to control input ratings above 75,000 Btu. per hour. Solenoid valves for operating diaphragm valves are permitted.
- 14. The construction shall be such that all parts of the casing rest on a metal frame or base. It is recommended that an air-tight metal base plate be provided under all parts of the unit and that this plate be joined to the casing by a slip joint or other means to insure air-tightness.
- 15. All controls should be enclosed.
- 16. Main burners shall ignite and extinguish without appreciable noise.
- Expansion and contraction noises shall be absent
- while heating up, cooling off, and during operation.

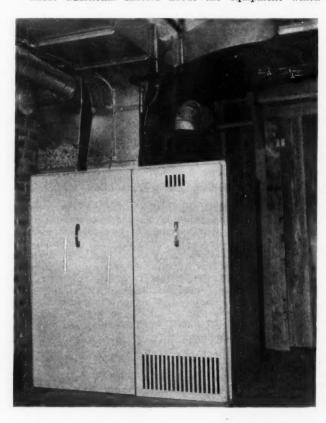
  18. Provisions shall be made to prevent transmission of fan or motor noise to sheet metal parts of cabinet or duct work.
- 19. Electrical motors, other control and burner venturi equipment should be high enough from the floor to prevent damage from 6 inches of water in the base-
- 20. Pilots shall be located in such a position that they can be readily observed and lighted by the customer without the use of a taper. (Outside lighters are recommended.)
- 21. Definite instructions for lighting pilots and other maintenance of the heating equipment shall be conspicuously and permanently displayed.
- 22. Needle valves shall not be used in any gas pilot lines. All pilot supply connection shall be taken off of the
- high pressure side of the gas pressure regulator. The automatic blower switch shall have a graduated scale with means for ready and independent adjustment of cut-in and cut-out temperature.

#### Durability:

Construction features which if provided indicate long

- life, and if not provided indicate possible short life.
- If any part of the heat exchanger is made of steel, the flue products at all points shall be above 300°F. after ten minutes of operation at 75% of the A.G.A. input rating.
- If the combustion chamber is made of steel, the burner arrangement shall be such that there is no impingement of the flames against the walls of the combustion chamber.
- If the heat exchanger is made of steel, the construction shall be such that there are no points where condensation can trap and accumulate.
- In case the equipment is provided with controls that reduce the gas rate below its rated capacity, no condensation shall take place at any point when the equipment is operating at the lowest capacity which the control can be set for.
- The flue connection between the heat exchanger outlet and draft diverter inlet shall be made of noncorrosive material (lead coated pipe, stainless steel, or equivalent, recommended).
- The construction shall be such that at no point does the heat exchanger reach an excessive temperature during normal operation.
- 7. The inside and outside of all sheet metal parts of the casing shall be painted or galvanized to retard
- All points where the heat exchanger comes in contact with the casing shall be insulated to retard conduc-
- 9. Humidifier pans shall have an inside finish which is non-corrosive (porcelain enamel or stainless steel recommended).
- All panels, seams, doors and grilles should be constructed of such materials or thickness that they will not easily buckle or dent during assembly or after installation.
- 11. Bolts or rivets should be used in all cases to fasten parts that are subject to load or vibration.
- 12. The motor base shall be constructed so that the pulley and belt can be accurately aligned to prevent wearing of the belt.

Those additional factors about the equipment which



would give added safety from the standpoint of customer operation and controls,

 The automatic gas valve shall not be provided with means for manual operation unless the limit control is such that it will operate independently of electrical energy.

The pilot arrangement shall be such that the pilot can be turned on and lighted while the main burner gas supply is shut off manually. (Three-way valves

are recommended.)

If provision for shutting off the primary air or secondary air during the off periods is provided, such control shall be designed so that it fails in a safe

(open) position.

4. The draft hood shall be so constructed that when a down draft pressure ranging from 0 to 0.1 inches water column is supplied, the main burner flames will not be extinguished, flash back, lift, float or burn outside of the appliance, nor the concentration of carbon monoxide (CO) in the flue gases be in excess of 0.04% when the appliance is operating at A. G. A. rating with a normal supply.

5. The assembly of the combustion chamber and heat exchanger shall be such that it is impossible for circulated air to become mixed with the products of combustion or for the products of combustion to

become mixed with the circulated air.

The operation shall be such that the combustion characteristics are the same during on and off periods of the blower.

- No part of the controls or casing shall reach more than 150° F. after an operating period of two hours at rated input.
- No pilot flame shall impinge on any metal surface except the thermal element of the safety controls.
- All motors shall be provided with thermal overload protection.

#### Efficiency and Capacity:

Such features that make for higher efficiencies and flexibility of capacity.

 The thermal efficiency under A. G. A. test conditions shall be 76% or higher.

2. When operating 30 minutes on and 60 minutes off by thermostatic control, the efficiency of the unit

should not drop more than 5%.

3. The air delivery capacity of the blower should be such that 1 C. F. M. is delivered at the furnace outlet for each 100 Btu. input when the static pressure is 0.2 inches water column and the blower is operating at not more than 1800 FPM peripheral speed.

4. The area of the filters should be at least 1 sq. in.

for each 200 Btu. input rating.

5. The equipment shall be able to operate at 10% above the rated input capacity without creating more than 0.04% carbon monoxide (CO) in the flue gases and the flue temperature should not increase more than 75° under these conditions.

 All motors of ¼ H. P. and over should be of the capacitor type.

- The construction shall be such that there is no heat radiated from the combustion chamber to the basement floor.
- No part of the motor shall reach more than 190° F. after one hour of operation at the capacity required for maximum air delivery.

#### II-Size of Heating Unit

Before the size of the heating plant can be accurately determined, it is necessary to have the heat loss of the building in question. This should be determined from a heat loss survey which takes into consideration the design temperature and the various construction factors of the building.

The heat loss information which is shown in Appendix A\* will be used by The Peoples Gas Light and Coke

Company as a basis for checking the size of the heating plant. The various factors given in this appendix should not be interpreted as the only approved method by which heat loss information can be determined or for sizing duct work required in individual rooms.

The following table provides a convenient method for selecting the proper size winter air conditioning unit for a given heat loss. It should be noted that in addition to stating the proper size heating unit required for a given heat loss, the minimum blower capacities and maximum volume of heated spaces are also shown, these being considered minimum requirements for Certified Quality.

Btu. Heat Loss of Bldg./Hour	Input Capacity of Heating Unit*	Air Delivery Capacity Required: C.F.M.†	Maximum Allowable Volume of Heated Space				
40,000	60,000	600	6,000				
45,000	67,500	675	6,750				
50,000	75,000	750	7,500				
55,000	82,500	825	8,250				
60,000	90,000	900	9,000				
65,000	97,500	975	9,750				
70,000	105,000	1050	10,500				
75,000	112,500	1125	11,250				
80,000	120,000	1200	12,000				
85,000	127,500	1275	12,750				
90,000	135,000	1350	13,500				
95,000	142,500	1425	14,250				
100,000	150,000	1500	15,000				
105,000	157,500	1575	15,750				
110,000	165,000	1650	16,500				
115,000	172,500	1725	17,250				
120,000	180,000	1800	18,000				
125,000	187,500	1875	18,750				
130,000	195,000	1950	19,500				
135,000	202,500	2025	20,250				
140,000	210,000	2100	21,000				
145,000	217,500	2175	21,750				
150,000	225,000 .	2250	22,500				

\*Based on adding 20% to the heat loss per hour and dividing by 80% efficiency.

†Based on a requirement of 1 C.F.M. for each 100 Btu. input capacity.

‡Include all heated spaces in which there are warm air outlets.

#### III—Installation Specifications

These requirements relate to the important considerations about controls, electrical work, duct work, and installation layout that should be made by the contractor when making his proposed application of Gas-Fired Winter Air Conditioning Equipment to a given building. A primary requisite under these requirements is that the installation be in conformity with local building and fire regulations and with the regulations of the National Board of Fire Underwriters.

#### Controls:

These requirements refer only to those controls which are not a part of a standard winter air conditioning unit which, in all cases, shall not be considered as complete unless provided with a high temperature limit control, automatic blower switch, safety pilots, automatic gas supply valve, gas pressure regulator, and manual shutoff valves.

Room Thermostat.—A low voltage room thermostat shall be required on all installations. Heat actuated (or equivalent) type thermostats should be used.

Thermostat shall be installed on an inside wall not (Continued on page 181)

<sup>\*</sup>Appendix A is a table of standard heat loss factors used by The Peoples Gas Light and Coke Co. to determine proper sizes of equipment.



## Camp Custer—A Defense Housing Project

Management—far-seeing to envision the true scope of the task ahead; analytical, to solve the dozens of pressing problems faced daily; courageous, to be willing to spend the large sums of money required and to organize operations on the tremendous scale required knowing that, at best, the work will be short-lived—is the "key" to profitable national defense housing contracts for heating.

A COMPLETELY comprehensive example of the vital need for operations management in cantonment heating is the \$600,000 contract for forced warm air heating in Camp Custer, Michigan, executed by Sunbeam Heating and Air Conditioning Company of Chicago. The work was let in three contracts. In the first contract, with additions to original orders, were 282 furnaces each with a blower, filters, controls and duct system. In contract 2 there were added 217 furnaces, blowers, controls, duct systems and in contract 3 an additional 95 furnaces, blowers, controls and duct systems. Total 594 systems.

An analysis of the project, showing types of buildings heated, sizes and types of furnaces installed, heat loss, cfm and all pertinent data is shown in the accompanying Project Chart. Impressive as this Project Chart is, the chart does not tell the whole story of cantonment heating and an understanding of the general scope of the camp is needed to appreciate the management problem which confronted Sunbeam.

Camp Custer is known as a cantonment type camp for the northern area to accommodate one division of approximately 19,000 officers and enlisted men and costing approximately 8 million dollars. The major buildings involved are—316 63-man barracks (forced warm air); 44 45-man barracks (forced warm air); 130 recreation or day rooms (forced warm air); 34 officers quar-

ters (forced warm air); 124 mess halls (stove heated); 130 storehouses (stove heated). In addition there are dozens of other buildings heated by warm air, serving special purposes. A comparison of the typical cantonment building schedule with Sunbeam's Project Chart will show what kind of buildings these are and how they are heated. All furnaces used were manufactured by the Lennox Furnace Co.

The forced warm air systems installed range from a unit heating a three-room officers house with a heat loss of 67,000 Btu to the double Utility Building which requires one 770,000 and one 760,000 Btu furnace.

#### **Operating Problems**

With this very brief outline of the scope of the contract in mind, the problems confronting the heating contractor begin to take shape. Five hundred and ninety-four furnaces, 594 duct systems to be installed in 594 buildings, within the few weeks allowed for completion, necessitated organization which could be whipped into a smoothly functioning program in the shortest possible time and which would function without tie-ups once work began.

The vitally important preliminary problems

ect

Imloes ing the ent

one enlion -316 man

uar-

1941

were—1: adequate shop facilities; 2: a large amount of storage space; 3: immediate delivery and continued delivery of furnaces, sheets, registers, controls, etc.; 4: a force of mechanics practically as large as could be hired; 5: a supervisory force to keep shop and field forces operating without loss of time; 6: over all these, "top management" able to handle the financing, operating, and intra-sub-contractor relationships so vital to the smooth completion of the camp's construction.

How all these needs were co-related and welded into an efficient program is proof of the opening statement that management is the "key" to defense housing contracts.

#### Personnel Organization

The first important decision which had to be made was how far on the home organization President R. G. Evans could draw without upsetting the home organization. Sunbeam Heating and Air Conditioning Company is one of the country's largest furnace installers and the fall of 1940 is likely to be the company's biggest season in Chicago. President Evans decided to do the all-important "top managing" in Camp Custer personally, leaving the home organization to

#### FORT CUSTER PROJECT, BATTLE CREEK, MICH.

I			NUME	BER .	f Buil	LDING	35	GOVERNMEN	T SPE	CS	5	BLOWER	MO (SEE	TOR NOTE)	BREE	CHING
	PLAN NUMBER TYPE of BUILDING	ORIGINAL DE	ADDITIONS 1.	CONTRACT "3	CONTRACT *4	TOTAL	B.T U	1 1	S. P.	27	DIAMETER	H P.	VOLTS	DIAMETER	HEIGHTS to Q.	
-	700-1171	63 MEN BARRACKS	135	20	103	57	315	446,800	5610	<b>%</b>	600,000	21"	11/2	220	12"	594
1	700 - 1257	OFFICERS QUARTERS - 0Q-40	10		9	2	21	735,000	8050	3/8	800,000	24"	11/2	220	14"	54%
1	700-253	ADMINISTRATION - A-22	1				1	560,000	6810	1/2	600,000	21"	2	220	12"	594
-	700 - 251	ADMINISTRATION - A-10	4	1	2		7	295,000	4900	1/8	458,000	21*	1	220	10"	29%
-	700 - 299	POST OFFICE PO-2	1				1	348,000		_	458,000	21"	1	220	10"	29%
1	700-330	TELEPHONE TT-2	1				- 1	289,000	4790	1/8	458,000	21"	1	220	10"	29%
	700-297	POST EXCHANGE 'E-3	4	2	2	- 1	9	364,000	6100	1/4	458,000	21"	1	220	10"	29/2
١	700-310	RECREATION RB-1	5	- 1	2	2	10	473,000	5700	1/4	600,000	21"	3/4	220	12"	594
ĺ	700-318	UTILITY SP-11	1				1	770,000	45 18	1/2	800,000	.21**	1/2	220	14"	54%
1	700-314	MOTOR REPAIRS SP-2	4	- 2	3	6	- 11	505,000	8395	8	600,000	24"	1/2	220	12"	59%
1	700-326	STOREHOUSE SH-18	2	-1	2		3	773,000	-	1/2	800,000	24*	2	220	14"	54/2
1	700-378	RECREATION A-5	67		32	9	108	145,000	2400	1/4	170,000	16"	1/3	110	9"	231/2
ı	700-301	OFFICERS QUARTERS Q.7	- 1				1	145,000	2380	-	170,000	16"	1/2	220	9"	23%
ı	700- 251	ADMINISTRATION A.7	4			5	9	220,200	3700	4	241,000	18"	1/2	220	10"	46
1	700-260	GUARD HOUSE GH-2	6		2	2	10	1.27,000	2350	/8	140,000	16"	1/4	110	9"	23%
1	700-277	FIRE STATION F-2	2		1		3	217,000	40CC	1/8	241,000	18"	1/2	220	10"	46
ı	700 - 297	POST EXCHANGE E-2	1	1		1	3	238,000	4000	1/4	279,500	18"	1/2	220	10"	46
	700-279	INFIRMARY 1.2	5	1.	2	2	10	207,000	-	1/4	241,000	18*	1/2	220	10	46
	700-313	MOTOR REPAIRS SP-1	4				4	238,000	3400	1/8	279,500	18"	1/3	110	10"	46
	700-260	GUARD HOUSE GH-1		1			- 1	76,000	-	/8	97,250	12	1/6	110	8"	24%
	700-1179	45 MEN BARRACKS			44		44	335,000	42.50	3/8	458,000	18"	3/4	220	10"	29%
	700-301	OFFICERS QUARTERS Q.9			6		6	67,000	-	1/4	97,250	12"	1/6	110	8	243/4
	700 - 301	OFFICERS QUARTERS Q-8			2		2	115,000		18	119,300	16"	.43	110	8"	24 %
	700 - 1257	OFFICERS QUARTERS OQM-40			1		-	735,000	-	Va	800,000	24"	1/2	220	14"	54%
	700 - 1258	OFFICERS QUARTERS OQM-14			1		1	375,000	4350	3/8	458,000	18	3/4	220	10"	29%
	700-1290	GUEST HOUSE			1		1	760,000	8600	1/4	800,000	24	1/2	220	14"	54%
	700-1110	RECREATION AC				6	6	272,000	3200	1/4	279,500	18"	1/2	220	10"	46"
1			707	AL No	BL00	8, 11/27/4	590									

<sup>\*</sup> These buildings have no water supply and no humidifier is required

AMERICAN ARTISAN, JANUARY, 1941 RESIDENTIAL AIR CONDITIONING SECTION









Upper left—Shop in Battle Creek. Forty mehanics used here to fabricate duct work. Upper right—Another view of shop. Some 28,000 sq. ft. of floor space utilized for shop operations. Lower left—One crew fabricated register stubs and fastened the face to the stub in the shop. Lower right—Third floor of shop building used to store large duct sections and fittings before delivery to camp

operate under trusted lieutenants. A general superintendent was taken from Chicago—James O'Connor. An assistant superintendent, in charge of shop and fabrication, Ed. Nelson, was also selected. A third assistant, Jack Molenar, in charge of field erection of furnaces and furnace room installation, was chosen.

Next, a shop was required. It was estimated that at least forty inside mechanics would be necessary to keep pace with the schedule; also approximately 100 furnaces would be needed at the start and additional furnaces, blowers, controls, registers, etc., would have to follow unfailingly on schedule until completion.

Four hundred fifty tons of sheets were purchased from Republic Steel Company for duct work, smoke breechings, etc. (does not include the probable use by Lennox of 600 tons of steel plate used in fabrication of furnaces and purchased from other manufacturers). This large tonnage had to be unloaded, stored, fabricated, stored again as sections, and collected ready for each installation.

This meant large floor space for the shop and storage. A three-story vacant building in Battle Creek was rented. There are about 28,000 square feet of floor area in the building and this space is allotted—first floor: sheet storage, office, space for operating a shear to cut drive cleats and hangers, shear and brake for preliminary forming; second floor: benches and machines for fabrication; there are three lock forming machines, two small folders, four large brakes, numerous bench machines for seaming, edging, punching, etc., and several dozen benches for assembly. The third floor was given over to storage of large duct sections fabricated and waiting for delivery to the designated building.

In addition to the main building there were two galvanized iron, one-story sheds; each about 12 by 100 feet on the ground. At one end of one shed the spur railroad track enters the shed and has an unloading crane and unloading platform. This area, of course, was allocated for unloading the furnaces and furnace sections. All in all the shop set up was practically "made to order" for the project.

The shop rented and equipped and the floor area designated for necessary operations, the next question was labor. In November, when the pictures were taken, there were 50 men working in the shop, in delivery, and in management and approximately 100 men organized into crews for field erection. All of these men were hired in

Battle Creek through the cooperation of the local business agent of the sheet metal workers union since this was strictly a "closed shop" job.

The working basis is 40 hours per week at \$1.12½ per hour. Nine hours per day were permitted if the extra hour was compensated for at "time and one-half." Saturday forenoon was also available at "time and one-half." Saturday afternoons and Sundays will probably be worked at "double time." In addition to the union mechanics, common labor (union) was permitted on certain operations. Common labor unloaded the furnaces and sheets, uncrated the furnaces at the building site or at the shop, cleaned up the premises after each system was complete, did all lifting, etc.; in short, was permitted to do all work which did not require working with the tools. Common labor rate was 60 cents per hour, with a 44-hour working week.

Realizing that the field force must be constantly supplied on schedule, the inside work was carefully organized. In this organization, delivery assumed an important role. The shop is about five miles from the camp field office. Furnaces which could be spotted at the proper building on arrival were unloaded at the camp and placed outside the furnace room door. Furnaces for which there was no ready building were stored in the downtown shed. As each building was ready for the duct installation, that building duct system was loaded on the truck and delivered,

with all pieces identified and the installing crew assigned for installation.

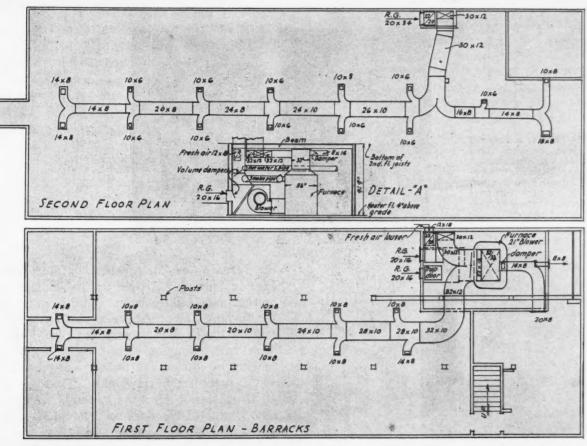
One picture shows a recreation building with a flag on the corner. These green flags were necessary to indicate the building in which crews were working for even as many crews as Sunbeam worked could easily be lost in this large area with the hundreds of buildings now existing.

The organization of the field forces was made with the idea of dividing the work into logical operations and the crews were sized and assigned in order that all divisions of work would go ahead smoothly and in accord with the basic schedule.

An interesting crew was the one which drilled holes for blower anchor bolts. There was no electric current available in the camp, so the heating contractor purchased a number of portable gas engine generators of 110 volt, ac. current, and these were used to operate the portable tools of this contractor. The anchor crew mounted their generator in the back of a roadster. The furnace room of the barracks has a full concrete foundation and a concrete floor—the only concrete in the building. Sheet metal templates were made up so that the two-man anchor crew had only to drive up to the building, lay down the template, start the generator and drill the holes.

The furnace then was uncrated, set in place and the radiator hung by the labor crew.

Two different crews of mechanics under differ-



Typical system in a 63-man, two-story barracks. Equipment room at first floor level. Ducts were divided into straight sections and take-off sections thus permitting fabrication of hundreds of duplicate pieces.

or iaes, ig, for oring

of ned latfor All

the the the

and

i in

1941

CTION

ent foremen were used to install the systems. The duct work crews (3 men each) placed all duct work up to the furnace room partition. These men worked on 4-foot stepladders, their work being simplified by the nature of the duct runs and the method of dividing the duct into sections. As the photographs show, the duct runs in barracks and small "day" buildings consist of 8-foot straight sections, one elbow, the register fittings. Registers are taken out of the main duct in opposing pairs so this fitting was made as one section and delivered ready to hang. The registers were assembled in stubs in the shop so the duct crew had only to cleat the stub to place the register. A photograph shows the register crew in the shop.

#### **Duct Construction and Erection**

In the barracks, the first floor run is underneath the ceiling; on the second floor the run lies on the roof truss bottom chords. Sections throughout were put together by drive cleats on the sides and standing seam cleats on the top and bottom. The bottom was further stiffened by engles riveted to the sections. Strap hangers from the joists support the duct. Cleats were bought in 8-foot lengths and cut to needed lengths in the shop and delivered in marked bundles to the job.

The duct work crew also handled one operation

in the furnace room—the task of setting the breeching between furnace and outside stack. This 14-gauge breeching, as most readers know, was the subject of criticism because the specifications call for 14-gauge, uncoated, copper bearing, open hearth refined iron painted both inside and outside with one coat of red lead and two coats of black graphite paint. Sunbeam bought the breeching, welded in sections which could be easily handled from Shouldice Brothers, a Battle Creek sheet metal contractor. Sections were put together as slip joints.

The furnace room crews of two or three men each (according to the size of the furnace) cased

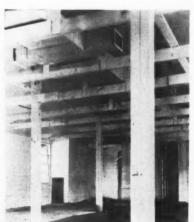


Above—Typical 63-man barracks duct in first floor. Furnace room and return air grille in left backgound. Lower left—Duct work exposed in roof trusses of the second floor of a 63-man barracks.



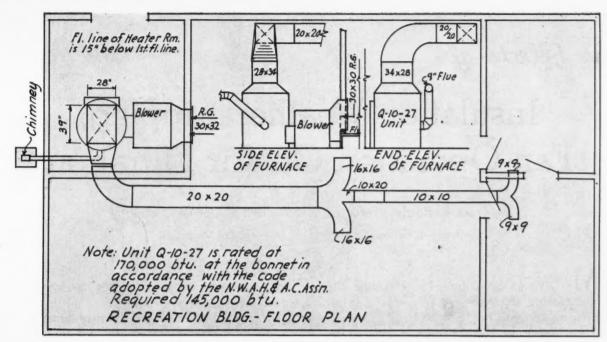


Right—Furnace and blower in a recreation room. This is a 145,000 Btu. output furnace. Mechanic of twoman furnace room crew, cutting ductwok for final connection between main and plenum.



the furnace (casing furnished with furnace by Lennox Furnace Co.), put up the shallow canopy and assembled the plenum and duct work inside the furnace room. This crew also made the connection to the duct system and placed the canvass connection on the blower. Some small amount of cutting and fitting had to be done by the furnace room crew, chiefly because of the tight quarters behind the furnace. As the plans show, some of the duct sections within the furnace room are quite large and heavy.

The installation and fabrication of the smoke stacks was sublet by the general contractor to



Installation of a small recreation room furnace. The ducts are behind a ceiling in some buildings with registers turning down from an elbow and in other buildings the duct is exposed. Details show pipe work in furnace room.

Michigan Sheet Metal Co. of Lansing, who welded the 42-foot stacks into single units and erected the stacks with a traveling crane as one of the photographs shows.

The installation of the controls and necessary wiring was also sublet to the electrical contractor, W. D. Gale, Inc., of Detroit. The control system on these hand-fired, coal furnaces consists of a thermostat placed in the barracks, a Cook damper motor to operate draft and check doors, and a combined fan and high limit switch (White-Rogers) which starts the fan when bonnet air is up to temperature, stops the fan when bonnet temperature falls and starts the fan in case bonnet temperatures become dangerously high when the thermostat is satisfied.

Duct work in the furnace room was not painted, but duct work in the barracks was sprayed three coats of white by the painting contractor who sprayed the inside of the rooms.

On completion of the furnace and duct installa-

tions, the labor crew cleaned up all waste material, all unused pieces, if any, collected all crating, paper, etc., and made the installation ready for inspection.

In a project of such magnitude, no one contractor, of course, could operate without regard for all other contractors. In appreciation of this, the general contractor—Owen, Ames, Kimball Co., Grand Rapids, Mich.—employed an engineer as coordinator. To this engineer went all claims, complaints, requests, problems and controversies. Each Wednesday night all sub-contractors met with the coordinator and the general superintendent, Mr. Max Pearce, who is also vice-president of Owen, Ames and Kimball, and the past week's and coming week's work was discussed and explained. At the same time each sub-contractor's progress was correlated with all other crafts so that the whole project progressed smoothly and on schedule and no one craft ran away from the others. This method was enthusiastically en-

(Continued on page 221)



le

nill by he ns

ke to

941 ION

Left—Smoke stack erected, Right—Traveling crane and crew erecting a smoke stack. Center—Buildings in which crews were working were identified by a green flag nailed on the street corner.





## The Effects of

## Insulation, Weatherstripping, Fan Operation On Air Filtration

By Frank B. Rowley, Director, and Richard C. Jordan, Instructor Engineering Experiment Station, University of Minnesota

Much has been done to determine the dust eliminating efficiencies of filters used in air conditioning systems.

But not nearly so much has been done to determine just how much these same filters will lower the dust concentration in the actual building.

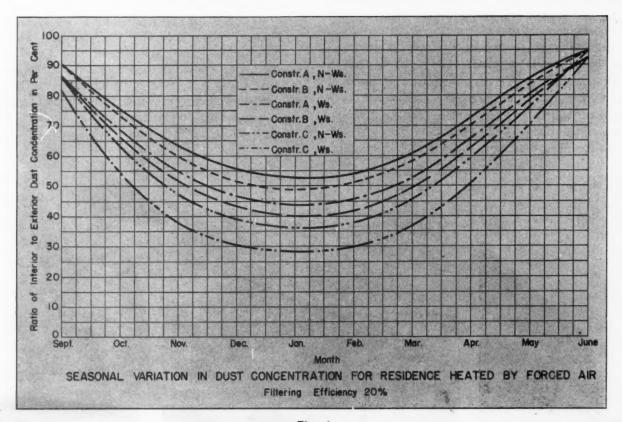
One thing which seemingly has not been thoroughly understood is that the rates at which dust laden air is introduced into the building; the rate at which dust is produced in the building; the rate at which dust settles out of the air; and the rate at which the air is filtered usually have more influence on the actual dust concentration in the building than has the efficiency of the filters themselves.

Filters of low efficiency may in time reduce the dust concentration in a building to a very low value if only a little dust is produced in, or introduced from the outside into, the conditioned space.

On the other hand, filters may have an efficiency rating approaching 100 per cent, but the dust concentration within the building still may be above that of the outdoor air if the rate of filtering is low and the dust is produced inside the space at a high rate.

All of these factors must be properly evaluated if an accurate estimate of the actual interior dust concentration is to be made.

In many instances too little consideration is given to the relative effects of these factors in the design of air filtration systems. This is especially true of residential heating and air conditioning systems. For example, in the usual residential system the filtration of air is secondary to the heating process. The filtration of air takes place only when the blower is operating to supply



# FOR THE BIG MARKET



# THE NAME TO REMEMBER

y of le

ed st

li-

es

It's a new name—a name you are going to hear much about. It's a name you will associate with quality. It's a name to remember for greater profits.

Today's big heating market is for the smaller low cost home. It is for this market that the Gilco furnace line is designed and priced. It is a complete line with sizes ranging from 55,000 B.T.U. to a 100,000 B.T.U. output—and a model for every type of installation. Their performance and quality will set a new standard—yet they are priced with the lowest.

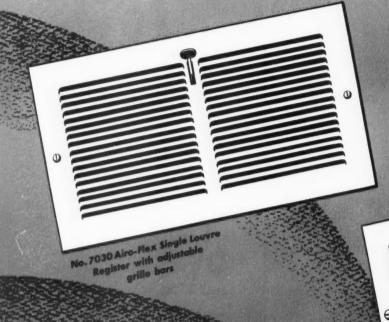
The Gilco oil burning water heater will meet every demand you have ever made for this type of equipment. Its clean, efficient, service free performance protects your profits and makes more sales. There are four sizes—20, 30, 40, and 50 gallon storage capacities—all, of course, completely automatic.

GILCO FURNACES! GILCO WATER HEATERS! Write today for complete information.

## J. L. GILLEN COMPANY DOWAGIAC, MICHIGAN

-Automatic Oil Fired Furnaces and Water Heaters-

Registers Intakes Grilles





 In these days when heavy demands are made on so many manufacturers, we are constantly improving Auer products and service facilities. On quality registers and grilles, Auer now offers the heating and air conditioning field more effective cooperation than ever before. All Auer Registers are moderately priced—some additions and refinements, is complete and modern, exceptionally so. Our line, with recent making it practical and profitable for more and more dealers to standardize on Aver, as a single and dependable source of supply.

THE AUER REGISTER COMPANY 3608 Payne Avenue Cleveland, Ohio

Let us send you the complete lels. Separate Catalog "G"

EFFICIENT · DURABLE · IN EXPENSIVE ATTRACTIVE · MODERN ·

AUER REGISTERS
GRILLES · For Air Conditioning and Gravity

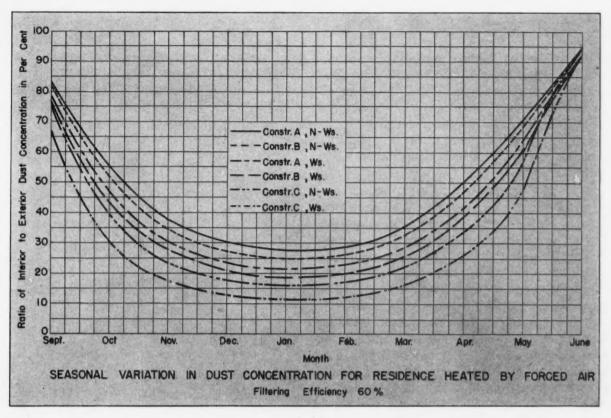


Fig. 2

heat to the house. As a result, in periods of mild weather, when little heat is needed, the average inside dust concentration runs comparatively high. Then, during the cold winter months when heating requires that the system operate comparatively long periods of time, the ratio of inside to outside dust concentrations will be much lower.

The problem is also complicated by factors of weatherstripping, owner living habits and other things. A clear picture of the problem can be obtained if we consider any typical residence, insulated and weatherstripped according to three common practices and calculate the dust concentration which may be expected.

For the typical residence the heat losses were first calculated for this structure by the usual methods and then, using these heat losses to determine the volumes of air circulated, a dust concentration analysis was made. Since a well insulated structure may receive less filtering than will a poorly insulated one because less air is circulated, three different constructions are considered. These constructions have been designated as A, B, and C and may be described briefly as follows:

#### Walls:

Construction A. 4-inch face brick, building paper, 1-inch fir sheathing, 2 by 4 studs 16 inches o. c., 4-inch rock wool bats, vapor barrier, wood lath and plaster.

Construction B. 4-inch face brick, building paper, 1-inch fir sheathing, 2 by 4 studs 16

inches o. c., ½-inch flexible insulation flanged in center of air space, vapor barrier, ½-inch insulation plaster base and ½-inch plaster.

Construction C. 4-inch face brick, building paper, 1-inch fir sheathing, 2 by 4 studs 16 inches o. c., vapor barrier, wood lath and plaster.

#### Second Floor Ceiling:

Construction A. 13/16-inch pine, 2 by 6 joists, 4-inch rock wool bats, vapor barrier, wood lath and plaster.

Construction B. 13/16-inch pine, 2 by 6 joists, 1-inch flexible insulation, vapor barrier,  $\frac{1}{2}$ -insulation plaster base and  $\frac{1}{2}$ -inch plaster.

Construction C. 13/16-inch pine, 2 by 6 joists, vapor barrier, wood lath and plaster.

In all cases the roof construction consisted of 2 by 6 rafters 16 inches o. c., 1-inch pine, and slate shingles. All windows were fitted with storm sash.

The heating requirements for these constructions were calculated according to the procedure recommended by the American Society of Heating and Ventilating Engineers, assuming Minneapolis as the location with the outdoor design temperature as —20 deg. F. and the inside temperature as 70 deg. F.

In analyzing the dust concentration variations the following assumptions were made:

(1) That infiltration is constant during all months of the heating season (Sept. through May for Minneapolis). This is approximately true as

<sup>&</sup>lt;sup>1</sup>Heating, Ventilating, Air Conditioning Guide, 1940, pp. 127-40, American Society of Heating and Ventilating Engineers, New York City.

the U.S. Weather Bureau<sup>2</sup> recordings show the range in average hourly wind velocities for Minneapolis to vary from a minimum of 11.0 m.p.h. in September to a 12.7 m.p.h. maximum in April.

(2) That the actual average heat loss for any single month is proportional to the difference between the average outdoor temperature for that month and an inside base temperature of 65 deg. F. (same base temperature as used for computation of degree days). The volumes of heated and filtered air which must then be supplied to satisfy these heat loses are calculated, based upon a 70 deg. F. temperature drop of the supply air.

(3) That infiltration takes place through onehalf the crackage of the structure and exfiltration through the other half and that no dust is removed in passing through the cracks. This latter assumption would appear to be correct for all except the largest particles, and even these are probably forcefully ejected into the rooms period-

ically by sudden gusts of wind.

(4) That the opening of windows and doors has no effect upon infiltration. This, of course, is not true, but the factor is so variable, depending upon the habits of the occupants, that it is difficult to evaluate. Actually this practice will raise the internal dust concentration above the theoretically calculated values. However, as one of the main purposes of this study is to obtain comparative rather than absolute values, this should not invalidate the conclusions.

(5) That the system is operating intermittently in order to satisfy the heating requirements and that the periods of operation and inoperation of the blower are never longer than one or two hours in length. This assumption permits the use of the following equation for determining the average dust concentration under equilibrium

$$C_{average} = \frac{LC_{o}\left(\frac{t_{1}}{t_{1}+t_{2}}\right) + L'C_{o}\left(\frac{t_{2}}{t_{1}+t_{2}}\right) + D + FC_{o}\left(1-E\right)\left(\frac{t_{1}}{t_{1}+t_{2}}\right)}{M\left(\frac{t_{1}}{t_{1}+t_{2}}\right) + M'\left(\frac{t_{2}}{t_{1}+t_{2}}\right) + Av + NE\left(\frac{t_{1}}{t_{1}+t_{2}}\right)}$$
.....(1)

L = infiltration air when blower is operating, c.f.m. L' = infiltration air when blower is not operating,

M = exfiltration air when blower is operating, c.f.m. M' = exfiltration air when blower is not operating, c.f.m.

N = recirculated air, c.f.m.

F = outside ventilation air, c.f.m. E = filtering efficiency, per cent t<sub>1</sub> = length of period of blower operation, minutes t<sub>2</sub> = length of period between blower operations, minutes

Co = outside air dust concentration, particles per cubic foot

Caverage = inside air average dust concentration, particles per cubic foot

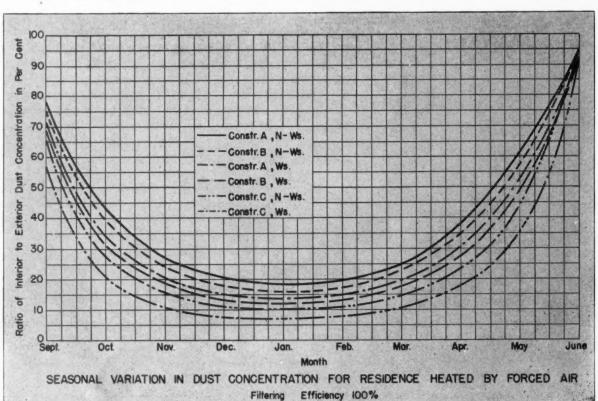
D = dust produced from inside sources, particles per minute

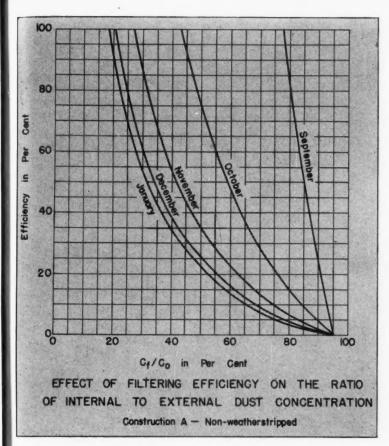
A = floor area of conditioned space, square feet velocity of settling of dust particles, feet per minute

Equation (1) results in a reasonably accurate approximation when the periods are one or two hours in length or shorter. This equation would therefore apply to the analysis of the majority of systems involving intermittent filtering (including most residential installations) under practically all operating conditions.

If it is further assumed that there was no internal dust sources (that is, D, the number of dust particles per minute produced from inside

<sup>2</sup>M. R. Hovde, Annual Meteorological Summary, 1939, Minneapolis, Minn. U. S. Dept. of Agriculture Weather Bureau.





...(1)

Fig. 4—Chart showing reduction in dust concentrations as filter efficiency is increased and as the fan runs longer percentages of time. Text explains fully.

sources, is equal to zero), that all of the air is recirculated, and that no outside ventilation air is introduced (that is, F, the c.f.m. of outside air, is equal to zero), this equation then reduces to:

$$C_{average} = \frac{LC_o}{L + Av + NE \left(\frac{t_1}{t_1 + t_2}\right)} \qquad (2)$$

(6) That the particle size distribution of the dust in the air inside the residence is typical and therefore the velocity of settling of these dust particles may be taken as 0.0036 ft. per minute.

By application of equation (2) and the foregoing assumptions the variations in dust concentration level with the time of year have been determined for constructions A, B, and C both with and without weatherstripping and with filtering efficiencies of 20 per cent, 60 per cent and 100 per cent. These efficiencies are on a particle count basis; that is, they represent the percentage of the number of dust particles in the air actually removed by the filter. Figures 1, 2, and 3 show graphically the results of this analysis. These curves indicate clearly the wide seasonal variations in interior concentration relative to exterior dust concentrations to be found in systems in which the filtering is dependent upon the heating process. In all cases there is very little reduction in the interior dust concentration during the spring and

fall months when the heating requirements are low.

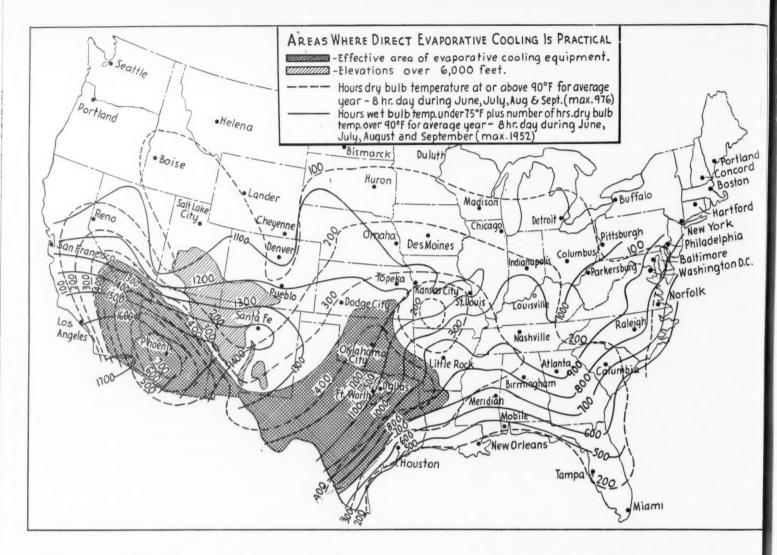
The relative positions of the curves representing different conditions of insulation and weatherstripping are the same in each of these graphs. In general an increase in insulation results in a higher average interior dust concentration, since additional insulation results in a lower heat loss and this in turn in a reduction in the required volume of heated air. Weatherstripping, on the other hand, affects the dust concentration level in two ways, as both the heat loss and the quantity of outdoor air dust introduced by infiltration are reduced by its application. The reduction in heat loss tends to increase the dust concentration, and the reduction in infiltration, to decrease the dust concentration. However, in all cases in this example the latter factor is dominant, and the addition of weatherstripping reduces the dust concentration level. The lowest dust concentration levels are attained in all cases in the uninsulated structure, construction C, with weatherstripping. The highest dust concentration levels occur in the best insulated structure, construction A, without weatherstripping.

#### Effect of Following Technical Code Air Change—Reg. Temp. Rules

It should be noted that the discussion in the last paragraph is based upon the assumption that a register temperature of 135°F. is used for all constructions. If, however, the register air temperature is allowed to vary and the number of air changes in the house is kept constant at 5 or 6 regardless of the construction, the relative position of the curves in Figures 1, 2, and 3 will be changed. The application of insulation will then have no effect upon dust concentration but the use of weatherstripping will still tend to reduce the dust level.

Figure 4 shows the relationship between the average ratio of interior to exterior dust concentration, Ct/Co, and filtering efficiency for construction A, non-weatherstripped, during various months of the year. During September the relationship is almost linear, but regardless of filtering efficiency the actual reduction in dust concentration is not great because the air is actually filtered only a small percentage of the total time. During December and January, on the other hand, the curve approaches the shape of a rectangular hyperbola. Thus, it may be seen that during the months when appreciable filtering of the air takes place, there is a decreasing return as far as reduction in dust concentration is concerned, with increasing filtering efficiency. In January increasing the efficiency from 0 to 50 per cent reduced the concentration ratio from 95 per cent to 32 per cent; but a further increase

(Continued on page 218)



## Areas Where Direct Evaporative Cooling Is Practical

FROM a study of the operation of numerous existing evaporative cooling systems, it appears that the most satisfactory results are obtained with these systems when the outside air dry bulb temperature during the daytime is 90° F. or more. Similar studies seem also to indicate that the most successful use of these systems is limited to those periods when the outside wet bulb temperature is below 75° F.

The accompanying map based on the climatic and topographical conditions in the United States was prepared from the meteorological records of the United States Weather Bureau. The dotted contour lines designate the number of hours that the outside dry bulb temperature is above 90° F. from 9:00 A. M. to 5:00 P. M. during the months of June, July, August and September in various localities. The maximum number of hours during this period is 976.

The solid contour lines represent the number of hours that the dry bulb temperature is above 90° F. plus the number of hours that the outside wet bulb temperature is below 75° F. during the same period; the maximum number being 1952.

An analysis of this map indicates that there are many sections of the country where the wet bulb temperature would make the use of evaporative cooling practical, but that the dry bulb temperature would hardly justify the installation.

Although there is a large part of the country where considerable comfort can be derived from the movement of air only (without the evaporation of moisture) from systems installed as described in the report which follows, it is felt that the majority of people would not consider such installations justified unless they could obtain the maximum benefits during at least one-third of

the summer season. Accordingly, the area shown on the accompanying map where evaporative cooling might be considered practical, is limited to those sections of the country where the dry bulb temperature is above 90° F. and the wet bulb temperature below 75° F. for at least one-third of the summer season.

Portland Concord Boston

Hartford

York

ngton D.C.

jelphia

tical

m-

is

ow um

nat

try

ike

out

dly

un-

de-

th-

om

ort

of

ons

ax-

of

1941

TION

From this map a district or territory, such as Phoenix, Arizona, is shown to be approximately on the 1630 wet and dry bulb contour line and on the 800 hour dry bulb contour line. This indicates that, on the basis of the hours that the wet bulb temperature is below 75° F. (1630—800—830), evaporative cooling might be considered effective 85% of the time, and on the basis of the number of hours that the dry bulb temperature is above 90° F., 82% of the time. From this it is seen that evaporative cooling can be successfully used a large part of the summer in this territory.

In the vicinity of El Paso, Texas, the weather records indicate that the wet bulb temperature is below 75° F. during the entire summer period, but that the dry bulb temperature is above 90° F. only a little more than one-third of the time. Therefore, in this area the dry bulb would be the determining factor.

Again, in the vicinity of San Antonio, Texas, it is noted that there are about 400 hours, or 41% of the summer daytime hours, that the dry bulb is above  $90^{\circ}$  F. and 600 hours, or 61% of the time, that the wet bulb is below  $75^{\circ}$  F.

As the coast line is approached, as for instance at Houston, Texas, where there are only 260 hours that the dry bulb temperature is above 90° F. and about 330 hours that the wet bulb is below 75° F., the installation of evaporative cooling systems would not be considered justified.

# Direct Evaporative Cooling for Homes in the Southwest\*

By A. J. Rummel
Air Conditioning Engineer, San Antonio Public Service Company

IN certain sections of the Southwest it has been observed that during the past several years greater public interest in the installation of direct evaporative cooling equipment in residences has occurred. In fact, in the areas where this type of comfort cooling is effective, the number of installations has outnumbered all other types of installations by a 10 to 1 ratio.

The mushroom growth of these installations and the increasing public desire for definite information as to just where and how effective and successful these installations are in those sections where the results might be considered doubtful, or on the borderline, resulted in the study reported here.

Since there are no generally accepted or defi-

nitely established standards for the cooling of residences by simple evaporation, the first step in such an investigation and study was to analyze the climatic conditions existing in different parts of the country, and to analyze the results of research as to temperature, humidity, air motion, etc., as related to human comfort. These results are shown on the map and explanation, preceding.

An analysis of the climatic conditions of the United States for the past 10 years indicates that there is a strip of approximately 400,000 square miles, about one-eighth of the total area of the United States, extending across parts of Texas, Oklahoma, New Mexico, southern Arizona, Nevada and California, in which the temperature and humidity conditions are such as to make the use of direct evaporative cooling practical. Although in most sections of this strip the use of

<sup>\*</sup>Paper presented at the Fall Meeting of the American Society of Heating and Ventilating Engineers, Houston, Texas, Oct. 14-15, 1940. Reprinted by permission.

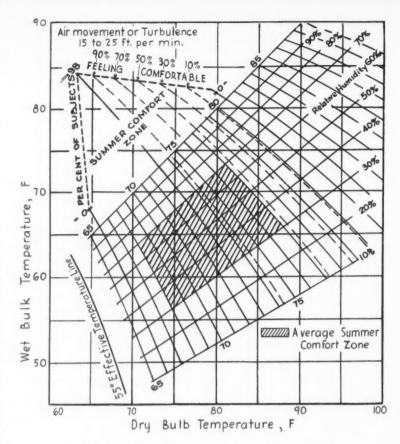


Fig. 1-Probable Comfort Chart for the Southwest.

direct evaporative cooling is effective in varying degrees, there are also sections where the relative humidity would permit the use of these systems but the maximum temperatures do not justify their use. This is also explained previously.

Recent investigations by the American Society of Heating and Ventilating Engineers indicate that the optimum effective temperature for completely air conditioned buildings in the Southwest, in which the period of time spent by the occupants is two or three hours, is approximately 73 F. Similar studies<sup>2</sup> conducted in the northern and eastern parts of the United States indicate that the optimum condition in those sections of the country was approximately 71 deg. E.T. These investigations tend to indicate that individuals in the area where evaporative cooling might be considered effective would be comfortable in conditions approximately 2 deg. higher in effective temperature than is commonly thought of as the optimum comfort condition based on the present day published comfort charts.

The question of maintaining comfortable conditions with high relative humidities, as is necessary with direct evaporative cooling, almost always invites some criticism. However, recent studies in this connection seem to indicate very

little difference in comfort with humidities at the upper limits of the comfort chart (Fig. 1). The 1940 edition of the Heating, Ventilating and Air Conditioning Guide has the following to say regarding the limits for comfortable living conditions:

Preliminary experiments at the ASHVE Research Laboratory would seem to indicate no appreciable impairment of comfort with relative humidities as high as 80 per cent provided the effective temperature is between 70 and 75 deg.

.....74.5 deg. E.T. and lower, results in satisfactory comfort conditions in the living quarters of a residence and while this condition is not representative of optimum comfort it provides for sufficient relief in hot weather to be acceptable to the majority of users.

Since these conclusions are based on tests made with individuals in the territory where the desired optimum effective temperature is 2 deg. lower than in the Southwest, it appears logical to suppose that in the territory where direct evaporative cooling is effective the maintenance of indoor effective temperatures in the neighborhood of 76½ deg. and lower might be acceptable to the majority of residential users as long as the relative humidity does not exceed the upper limit of the comfort zone. By referring to the probable comfort chart, Fig. 1, as prepared for the Southwest, it will be noted that at 761/2 deg. E.T. we might expect about 60 per cent of the people to feel comfortable in an air movement of from 15 to 25 F.P.M.

#### Feasible Conditions for Evaporative Cooling

Consider a location in the Southwest where an evaporative cooling installation is operating under conditions of 75 F. wet-bulb-the upper limit of wet-bulb where it is considered practicable to use this type of system. If the upper comfort zone humidity limit of 70 per cent is to be maintained with a 75 F. wet-bulb, the dry-bulb temperature will be 83 F. By referring to the accompanying comfort chart, Fig. 1, it will be noted that under conditions of an air movement of 15 to 25 F.P.M.—the average air movement in most air conditioned installations-and wet- and drybulb temperatures of 75 and 83 F., respectively, the effective temperature would be 79 deg. At this condition only 25 per cent of the occupants might be expected to feel comfortable.

Since it is not possible to obtain a lower drybulb temperature and still stay within the upper limit of relative humidity, the only alternative is to obtain a reduction in effective temperature by means of increased air movement.

It has been determined that in completely air conditioned buildings, if the air temperature is below 80 F. dry-bulb, air movements exceeding 25 F.P.M. have a tendency to produce a feeling of draft. However, when the air temperature is

ASHVE Research Report No. 1227, Reactions of Office Workers to Air Conditioning in South Texas, by A. J. Rummel, F. E. Giesecke, W. H. Badgett and A. T. Moses (ASHVE Transactions, Vol. 45, 1939, p. 459).

<sup>2.</sup> ASHVE Research Report No. 1136, Summer Cooling Requirements in Washington, D. C., and other Metropolitan Districts, by F. C. Houghten, Carl Gutberlet and Albert A. Rosenberg (ASHVE Transactions, Vol. 45, 1939, p. 577).

above 80 F., higher air velocities are possible without a feeling of draft and are desirable. By referring to Fig. 2 it will be noted that under conditions of 75 F. wet-bulb and 83 F. dry-bulb, to obtain an effective temperature of 76½ deg., it would be necessary to increase the air movement to approximately 200 F.P.M.

In an effort to determine whether or not home owners would be comfortable and satisfied under conditions of such high air movements, numerous investigations and personal interviews were made. In general, it was found that with the most common type of installation, where the air discharge was installed so that the air was introduced into the living quarters in a horizontal direction through a grille, the main objection was uneven air distribution. With this arrangement, when standing in the path of the air discharge a very high velocity of air was encountered while when out of the path of the air discharge the air movement was insufficient for comfort.

After a careful study of various reactions and objections had been made, an installation was planned in an effort to overcome as many of these objections as possible, and one that would result in the maximum comfort possible when operating under conditions close to the upper wet-bulb limit the greater part of the time.

d

f

nned

er is oy

ir is ng of

is

The system installed for test purposes was made in a five-room frame cottage located in San Antonio, Texas. The installation was made so that the system could be operated with the windows and doors open or closed, with individual air supplies to each room, and with a humidistat to limit the moisture that would be added to the air.

The evaporative cooling unit itself was installed in the attic of the home as shown in Fig. 3. Individual galvanized iron ducts were run to the center of each room, terminating at the ceiling



Fig. 3—Duct work in attic and opening in central hallway through which air enters attic

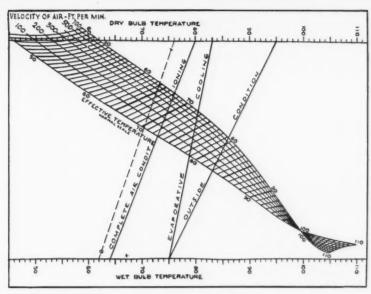


Fig. 2-Effective Comfort Chart.

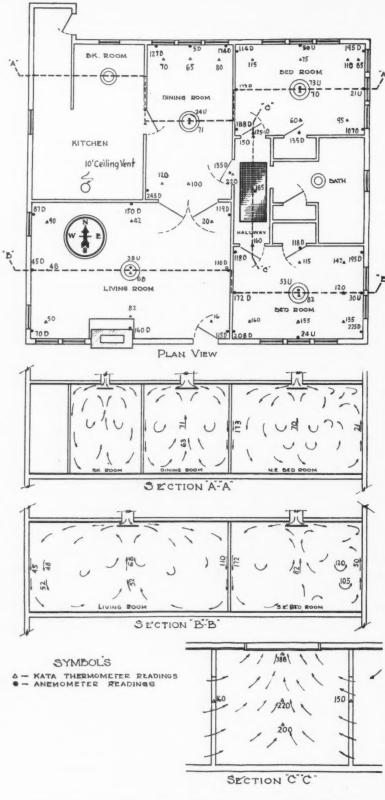
plaque, as shown in Fig. 4. In the ceiling of the central hallway there was installed a 3 ft. by 6 ft. exhaust grille having a net free area of 12.46 sq. ft. and in the kitchen, directly above the gas range, a 10 in. round vent with an area of 0.54 sq. ft. Under the eaves of the house the cornice facing was removed and ¼-in. hardware screening installed; also, louvers were installed in the gables at each end of the house. A humidistat which was connected to a water valve supplying the water to the evaporative pads was placed in the central hallway.

The operation of the system was such that, with the windows and doors of the house closed, outside air was drawn through the wetted pads by a blower, after which the air was delivered to each room through the central ceiling plaque shown in Fig. 4.

The installation was made on the basis of a 700 F.P.M. velocity through the ducts, and a 350 F.P.M. discharge velocity from the ceiling plaque. The blower and cooler assembly was mounted on cork in the attic, and the 1 h.p. motor operating



Fig. 4—Ceiling plaque through which air was introduced into living room



Left—Fig. 6—Air velocities in rooms in test house. The figures show actual air velocities at points indicated.

Below—Typical chart of temperature and humidity in the test house.

the twin blower was mounted on a floating base. The insides of all ducts delivering air to the rooms were lined with acoustical felt for a distance of two feet from the outlet of the fan. Although all equipment was installed in the attic, there was no objectionable noise or vibration when the system was in operation.

After the air which is drawn into the unit from outdoors has its dry-bulb temperature reduced, it is discharged into the room. When operating with all windows and doors closed, the pressure inside the house is naturally higher than that outdoors. Under these conditions the air, after passing through the rooms, is exhausted through the grille in the central hallway into the attic space and out of the attic, through the openings under the eaves of the house, to the outside.

#### Results in the Test House

The installation was completed and put into operation on July 17, 1939. Readings were taken with an anemometer at the exhaust grille in the hallway and kitchen with all windows and doors closed. The average velocity of the air at the hall grille was 388 F.P.M. and at the kitchen grille 420 F.P.M. At these velocities the air being discharged into the attic space through the hall grille was 6903 C.F.M. and through the kitchen vent 227 C.F.M., giving a total of 7130 C.F.M.

Since the volume of the house was 9300 cu. ft. and that of the attic 3600 cu. ft, the air was being changed in the house every 1.3 minutes, and in the attic every one-half minute.

Static pressure readings taken on the inlet and outlet sides of the blower showed 0.12 in. of water and 0.13 in. of water, respectively, a total of 0.25 in. of water.

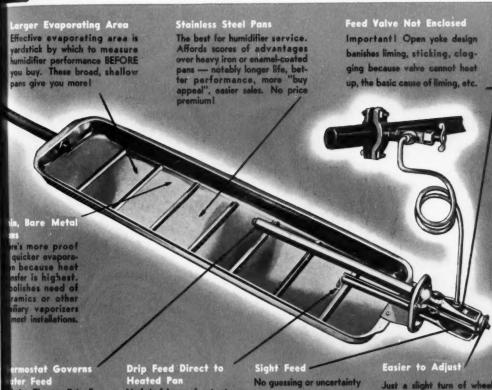
The flow of water to the evaporative pads was set at 0.78 gallons per minute. The excess water was taken through a drain pipe on the outside of the house, to the back of the house, where a garden hose was connected and the water used to water the lawn and garden.

A 1 h.p. single-phase motor rated at 6.3 amp. and 220 volts was used to operate the twin blower. When the system was operating, as stated previously, readings taken showed that the motor was using 948 watts at 6 amp. and 232 volts.

Temperature and humidity readings taken inside when the outside dry-bulb temperature was

(Continued on page 186)





lusive Thermo-Drip Fee-Keeps moist vapors in e with temperature fluctions. Admittedly the t method of balancing

ıs

of

11

as

S-

m d,

re itishe ce

en che

ors

he

en

air

the

ch-M.

ft.

ing

in

and

ter

0.25

was

ater

e of

den

ater

mp.

ow-

ated

otor

in-

was

1941 CTION No brimful pan of water to heat to vaporizing stage. Parade of water drops keeps pan surface scarcely more than moist . . . ideal for vaporizing. No guessing or uncertainty about operation of this humidifier—drops of water leaving valve are in plain sight. Facilitates adjustJust a slight turn of wheel with thumb and forefinger produces desired amount of evaporation for individual preference or need.

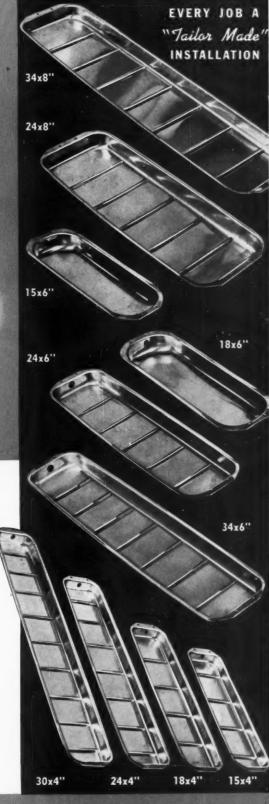
CHANGE! Progress! That's the order of the day in home heating—new furnace designs, new firing convenience, new safeguards against discomfort and bodily ills. And the most important progress has come in one of these—HUMIDIFICATION. It's the safeguard against "chilly 70" and the kind of indoor atmospheres that bring an appalling increase in "family colds" and the misery of other ailments.

The warm air heating system that reflects this progress is the one in which Thermo-Drip Humidifier provides this safeguard. With Thermo-Drip included in your bids for new furnace jobs and replacements, you'll find it easy to convince prospects that your installations

go all the way . . . according to today's standards of home heating . . . in providing healthful, comfortable warmth through the years.

Make sure you equip with Thermo-Drip. Put its powerful selling features to work for you. Particularly the salesclinching feature of measured moisture, which this humidifier brings to you through its temperature-actuated, dripfeed valve. Glance at the other points of design and construction, and notice, too, that Thermo-Drip has no mechanical or electrical parts to get out of order, no float and no deep, trough-like pan in which the water evaporating surface is likely to become sealed by scum or film. These and many other reasons explain why Thermo-Drip is the fastest-growing accepted type of air moistening equipment.

> Consult your wholesaler or write us today for complete details





AUTOMATIC HUMIDIFIER

MANUFACTURERS

CEDAR FALLS, IOWA



# UTILLY

Gas-Fired Heating Equipment, Air Koolers and Blowers

Multiple-fin element and hollow baffle —compact design—gas-fired, forced-air furnaces.

> UTILITY SOL AIR

> > Floor or dual reg-ister furnaces— all-welded—diestamped grilles—in-terlocking gas valve.

Circulating heaters with built-in fan and nozzle-shaped out-let. Vented and unvented.

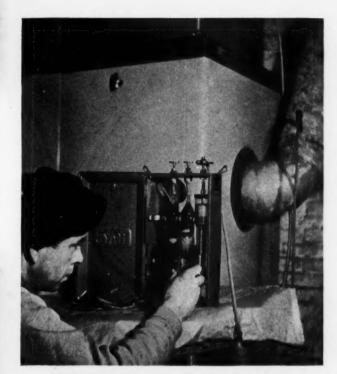
Utility evaporative air Koolers—with patented, exclusive features—for every type of building.

For closet or porch -These modern compact, forced-air furnaces.

Complete line of dycomplete line of dy-namically-balanced, multiple-vane cen-trifugal blowers.

Nrite for catalogs, prices and name of distributor to

Los Angeles, Calif.



The CO<sub>2</sub> efficiency of an oil burner flame cannot be judged "looking in the fire-box." A CO<sub>2</sub> analyzer is needed. Photograph shows mechanic of Home Heating Co., Hinsdale, Ill., using an analyzer. J. E. Peterson took the picture.

se modern

aporative

exclusive

-for every building. 1—I'm burning too much oil
2—My house doesn't heat
3—Jhere's a terrible smell
of oil
4—You can hear the burner
all over the house
5—Jhe burner blew up
6—My burner won't run

### The 6 Common Oil Burner Complaints

By J. B. Wallis

Engineering Department, The Meyer Furnace Co.

No heating contractor should undertake the responsibility of heating a man's home with oil unless he is equipped with adequate burner repair parts, has the necessary testing equipment and sufficient knowledge of oil burners to render instant service when called upon to do so.

Those burner parts which may not be repairable on the job and can cause considerable delay in heating, unless replacement parts are available, should be kept on hand in case of emergency. I wonder what a customer would say if, at 2 o'clock some morning with the temperature about 10 deg. below zero, you told him his motor was burned out and that you would write the factory in the morning for a new one. Even a delay of a few hours in sub-zero weather can be of serious consequence. Many oil burner dealers have solved this problem by keeping a burner on display from which they can secure necessary replacement parts and then complete their display burner as soon as they can get repairs from the factory.

Testing equipment should at least consist of a draft gauge and a pressure gauge and, if a bur-

ner is to be adjusted to operate most efficiently, it will be necessary to use a CO<sub>2</sub> recorder and stack thermometer.

Several pages could be written on single phases of oil burner service, however, in this article I am going to discuss briefly those problems which commonly occur in everyday service work.

Oil burner service can be classified in two groups. First, casual complaints which do not require immediate attention and, second, urgent calls which must be attended to at once. While the latter sounds the most serious, they are usually much simpler for the service man to solve than those complaints that can be classified in group one. First, let us discuss some of these so-called "casual complaints."

One of the most common complaints in group one is that the burner is using too much oil. Quite often this complaint is due to the owner's ignorance of how much oil should be required to heat his home. But, just about as often, a complaint of this nature is justified, and the owner fails to complain because he too does not know how much oil should be required.

Excessive oil consumption can be due to the following:

- 1—Air leaks around burner blast tube and furnace doors which result in a low percentage of CO<sub>2</sub> and a high stack temperature.
- 2—High stack temperature due to short fluegas travel.
- 3—Improper combustion chamber design.
- 4-Wrong nozzle size.
- 5-Too much draft.
- 6—Burner not adjusted properly.

### How to Estimate Oil Consumption

In selling an oil burner it is best not to commit yourself on the amount of oil that will be required to heat the prospect's home. If you must estimate fuel consumption, it should be done in this manner. Determine the Btu per hour heat loss of the building and estimate the efficiency of the heating equipment, which is about 60 or 65% where an oil burner is installed in a furnace designed for coal burning. The fuel consumption can then be estimated by the following equation:

$${
m H_b} imes {
m DD} imes 24$$

-= Gal. per average heating

 $(T_1 - T_0) \times E \times H_t$  season

Where:

H<sub>b</sub> = Heat loss of Building (Btu/hr);

 $T_1 = Inside Temperature;$ 

 $T_0 = \text{Outside Temperature}$ ;

DD = Degree Days;

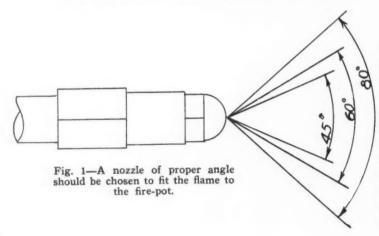
24 = Number of hours in a day:

E = Overall efficiency of system;

 $H_t = Btu$  heat content of fuel/gal.

If the burner is properly installed and adjusted, this complaint can usually be avoided unless too low an estimate of fuel consumption has been given the owner.

If an oil burner is to operate most efficiently, all air leaks around the furnace doors and burner blast tube must be tightly sealed. Any such air leaks will result in a low percentage of CO<sub>2</sub> and





A draft gauge is another essential instrument for the oil burner service man. Home Heating Co. mechanic taking a draft reading.

excessive stack temperature. The percentage of  $CO_2$  can only be determined by use of a flue gas analyzer. I don't believe there is any oil burner service man who can tell how efficiently a burner is operating by the appearance of the flame.

If, after all air leaks have been eliminated, the percentage of CO<sub>2</sub> is less than about 8 per cent, steps should be taken to increase it. Eight per cent is considered satisfactory on conversion installations, but where the furnace is designed for oil burning, it is usually possible to obtain between 11 and 12 per cent without smoke. The burner should be adjusted so the flame is orange in color with just a slight trace of smoke at the tips of the flame. If the CO<sub>2</sub> is low, various nozzle sizes should be tried. Changing the angle of the oil spray will also have some effect on the combustion efficiency. (See Fig. 1.)

### There Must Be a "Steady" Draft

Any variation in the draft will cause a variation in the amount of air delivered for combustion by the burner fan. Therefore, a constant burner adjustment cannot be obtained unless a steady draft is maintained by means of an automatic draft stabilizer. Any draft in excess of that necessary to carry away the products of combustion will result in unnecessary stack loss. The draft stabilizer should be adjusted by means of a draft gauge. About .02 inch of water in most cases is sufficient. The amount of draft loss through the heating equipment depends on the design of the furnace. Therefore, to be sure of a

positive draft in the combustion chamber, the draft reading should be taken over the fire with the burner operating. If the burner operates with a *pressure* in the combustion chamber this will result in sooting up the electrodes and a possible ignition failure.

If the outlet for the products of combustion from the combustion chamber is so arranged that the gases can travel directly to the outlet, a corbel should be placed on the top of the firepot opposite the burner blast tube to divert the gases away from the outlet. This will result in longer flue gas travel and an increase in heat transfer.

The nozzle size should be based on the heat requirements of the building and should not be larger than required to heat the building under extreme conditions. The combustion chamber size should be based on about 100 sq. in. of floor space per gallon of oil burned per hour.

If care is taken to make the proper burner and draft adjustments and if an estimate of fuel consumption is necessary and the estimate is figured from the heat loss of the building, most likely there will be no complaint of excessive fuel consumption.

### House Doesn't Heat? Check Thermostat

One rather common complaint where automatic heat is used is that the house does not heat. I drove several hundred miles on one occasion to check the installation, when the owner threatened to take the furnace out for this reason. I found the temperatures in all rooms were low with the exception of the dining room, in which the thermostat was located. In this case too much heat was being delivered to the room containing the

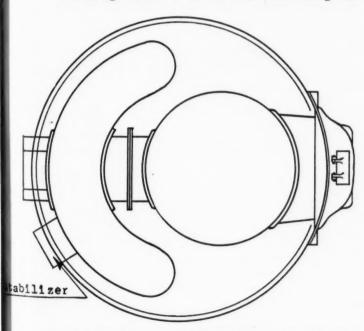


Fig. 2—Pulsations can sometimes be eliminated by placing a draft stabilizer in a stub welded as near the smoke outlet as possible.

thermostat which resulted in a furnace shut down before the temperatures in the rest of the house were up to the thermostat setting. By partially closing the damper in the pipe to the dining room we reduced the amount of heat delivered to the thermostat room which resulted in longer burner operations and raised the temperature in the rest of the house.

If the room containing the thermostat does not receive enough heat the remainder of the house will become too warm due to the long burner operations necessary to satisfy the thermostat.

The furnace in which an oil burner is to be installed should always be inspected to make sure it is gas-tight. This is especially true in the case of cast-iron furnaces where there are several cemented joints. Any leaks in the furnace will permit the odor of oil to enter the furnace casing and be carried up into the house.

If the odor of oil is noticeable in the basement, it may be due to leaks in the oil lines, or it may be caused by the burner operating with insufficient draft which would enable products of combustion to escape into the basement through cracks in the doors, or around the burner blast tube.

#### Pulsation and Its Remedy

A problem probably foremost in every oil burner service man's mind is pulsation. There are several ways to eliminate pulsation, but most of them greatly reduce the efficiency of the heating equipment. Some of the causes of pulsation are:

- 1-Insufficient draft.
- 2-Excessive draft.
- 3—Too much restriction of flue gas travel through furnace, causing a pressure in the combustion chamber.
- 4-Wrong combustion chamber size.
- 5-Wrong size or angle of nozzle.

Some of the remedies commonly used by oil burner service men are:

- 1—Introducing more air than necessary for combustion by opening air shutter on the burner.
- 2—Allowing air to escape and enter combustion chamber through cracks in doors or opening around burner blast tube.

3—Reducing oil rate.

Any of the above remedies will result in considerably lower operating efficiency, unless, in the case of the reduced oil rate, the combustion chamber is properly sized for the lesser amount of oil. I have found that pulsations can be eliminated if air can be introduced into the furnace near the outlet for products of combustion. This has little effect on the operating efficiency since the air enters the furnace near the vent and only affects

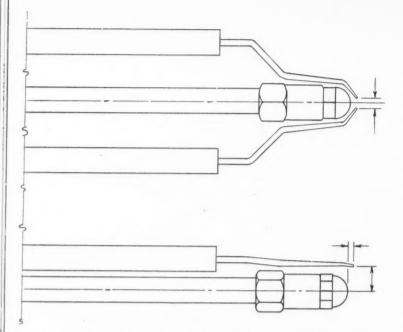


Fig. 4—Electrode "gap" should be measured as shown. The gap between points (above) should be 5/32-inch. The electrode point (below) should be 9/16-inch above the nozzle center. The distance the electrodes extend beyond the nozzle depends on the angle of the oil spray.

a very small portion of the heating surface. A 6-inch diameter pipe welded to the furnace at the back near the outlet, extending through the furnace casing and equipped with a draft stabilizer will usually eliminate burner pulsations. (See Fig. 2.)

Usually, where there is a tendency for the burner to pulsate, this condition can be overcome by varying the nozzle size, angle of oil spray, pressure or draft. However, it is sometimes necessary to sacrifice some efficiency if a burner is adjusted with only smooth operation in mind.

"Tank hum" is another problem commonly encountered by the service man. This condition can usually be eliminated by installing a needle valve in the feed line and restricting the flow of oil to the burner. If this method is used, a vacuum gauge should be used to make sure the oil is not restricted too much. An increase in vacuum of about 5 inches is usually sufficient, but in no case should the vacuum exceed 20 inches. Also, where this method is used, an air dome should be installed in the line between the valve and the pump. This should be assembled by placing a "T" in the line and screwing a  $\frac{3}{8}$  x 6-inch nipple into this pointing upward. The purpose of this is to absorb vibration created by the pump. (See Fig. 3.)

### Explosions May Be Caused by Faulty Ignition

Urgent service calls are usually that the burner has blown up or that the burner just won't run.

If an explosion occurs it is often quite hard to determine the cause. However, it is usually due to faulty ignition for some reason. On only two occasions have I been able to positively determine the cause of an explosion.

In one case an examination of the burner disclosed that a mouse had apparently been standing with his hind feet on one electrode and his front feet on the other one because, when I removed the electrode assembly, he was lying across the two electrodes "electrocuted." This is an unusual case, but any danger of this happening can be eliminated by placing a screen over the air intake on the burner. This reminds me of another case involving a mouse when I was called to investigate a disagreeable odor in the basement and found a dead mouse in the burner fan housing.

On another case where an explosion occurred, I inspected the burner and found the electrodes were very poorly adjusted. The spark gap was only about 1/16 inch and the electrodes were set very close to the nozzle and about 1/16 inch behind the orifice. During my conversation with the dealer I learned that the service man who had been taking care of this job sometimes worked on burners when he had "had one too many." Serious consequences can result from improper adjustment of an oil burner and this is especially true of the setting of the electrodes.

The electrodes should be set in accordance with dimensions shown in Fig. 4. The distance the electrodes extend beyond the nozzle depends on the angle of the oil spray. If the electrodes extend so far beyond the end of the nozzle that they are in the oil spray, they will burn off.

### A Control Checkup Procedure

If a call is received that the burner just won't run, a systematic inspection of the burner and controls should be made. First, reset the safety control. If the burner then runs satisfactorily, an attempt should be made to determine the cause and adjustments made to prevent a recurrence of the shut-down.

If the burner motor runs when the safety control is reset, but there is no flame, determine whether this failure to fire is due to lack of oil

(Continued on page 189)

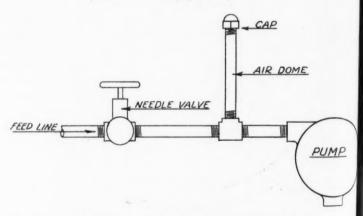


Fig. 3—Tank "hum" may be silenced by restricting oil flow by a needle valve and by installing an air cushion "dome" in the oil line.

# WATERBURY FURNACES AND AIR CONDITIONERS OIL · GAS · STOKER · HAND-FIRED

# PUT YOU in Business...and KEEP You There!

MEET every home-heating demand ... every fuel preference, every capacity requirement, every family budget . . . with the complete WATERBURY line!

Even more important to a GROWING and PROFITABLE business . . . make SURE of customer satisfaction that expresses itself in ENTHUSIASTIC recommendation to friends and neighbors. Each WATERBURY unit is CORRECTLY ENGINEERED, QUALITY BUILT and has been thoroughly TESTED and PROVED in the severe Northwest climate. WATERBURY units are outstandingly MODERN in design, in heating efficiency and economy, in ADVANCED construction and con-

# WATERBURY COMFORTROL AIR CONDITIONERS







Gas-fired Air Conditioner Flexible unit type adapt-able to any size. AD-VANCED safety-type gas





Hand-fired Air Conditioner for modest-income families. 9 sizes—118,400 to 375,000 Btu.

### Oil-fired Air Conditioner for larger homes, stores, halls, etc. 9 sizes—up to 380,700 Btu. FURNACES Oil-fired Air Conditioner for small and average homes. 2 sizes—75,000, 120,000 Btu. WARM AIR GRAVITY SEAMLESS

SEAMLESS GAS Furnace with Waterbury Heat Ex-changer flexible unit con-struction.

PUMP



SEAMLESS OIL Furnace for use with any good Oil Burner.



SEAMLESS STOKER FURNACE for use with any Standard Stoker.





WATERBURY GASTITE The Dependable Welded Steel Gravity Furnace, Moderate Price.

# The WATERBURY EXCLUSIVE TERRITORY FRANCHISE MAIL THIS COUPON

—gives you a commanding competitive advantage on ANY home-heating job—an advantage treasured by hundreds of WATERBURY dealers for many years. Join the rapidly growing family of prosperous Waterbury dealers. Write or wire at once for territory reservation and full information.

THE WATERMAN-WATERBURY CO. 1122 Jackson St. N. E., Minneapolis, Minn.

THE WATERMAN-V	1941 line and
Send catalog of	We are interested in
dealer propositi	Air Conditioner
- m.maces	- Coal

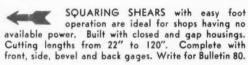
Send calais	We are	interestor
dealer proposition.	hand a	Conditioner Coal
for Oil	Gas	

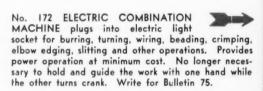
Name		

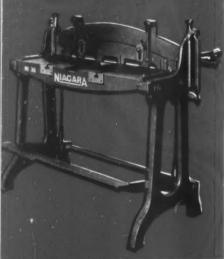
## BUYERS' GUIDE FOR SHEET METAL SHOPS



Niagara Machines and Tools are essential to every sheet metal shop. Among the many industries taking advantage of their easy, rapid operation, long life and minimum investment are air conditioning and warm air heating equipment manufacturers and installation contractors, airplane factories, metal sign makers, photo engravers, makers of light steel containers and pails, general sheet metal shops, vocational schools and maintenance departments of large industrial plants.





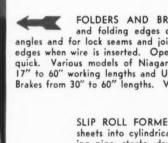


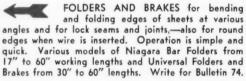
QUEEN CITY SHEARS are widely used for straight line cuts for trimming sheets.

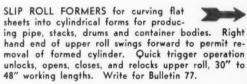
Designed for easy foot operation. Equipment includes Niagara knives and front, bevel, side and back gages. 5 sizes from 22" to 52" cutting lengths . . . capacity 18 gage. Write for Bulletin 80.



COMBINATION BENCH MACHINES
No. 131 and 147 perform burring, turning, wiring and elbow edging operations,—one machine with interchangeable rolls. All gears enclosed for fast operation with safety. Capacities 18 and 22 gage. Complete with bench standard, adjustable gage and wrench. Write for Bulletin 75.









UNIVERSAL ROTARY MACHINE for burring, turning, wiring, crimping and beading,—5 machines in 1. 24 gage capacity. Write

> NIAGARA BAR FOLDER clamps and folds in one operation. 6 sizes from 17" to 60" working lengths. 22 gage capacity. Write for Bulletin 74.

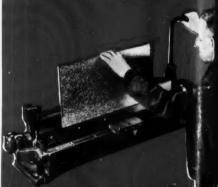












ADDRESS _									DDRE	SS_Z	7/2	Powh	atan	Dr				
CITY	Chica	go,	III					(	CITY_	Edg	ebro	ok,	TII					
QUIPMENT				FUE	1 Coal	_ TEM	P. DIFF.	80	REG	ISTER L	oc	DESIG	ON TEN	4P	BO	NNET TEI	MP	
Room	Cubical	Crackage	Ехр	Glass	Not Wall	Exp Floor	Exp Ceil.	WALL	B.T.U. Per	Equiv.	Reg. Temp.	Rnd. Pipe	Rect.	Vel.	Equiv.	Rnd. Pipe	Rect.	Vel.
Dimen- sions	Cont.	39.3	Wall	1.13	./9				Deg. T.D.			Corr.	Duct	Reg.	Length	Corr.	Duct	Rag.
Living	2673	39	441	48	393 75	297	42		188									
Kitchen 10\$ x 9\$ x9	1069	40	225	<i>38</i> <i>43</i>	187	119			117									
DINING 12\$x 11\$x9	1294	19	216	28	192	144	36		93									
Vestibule 5+x5+x9	272	21	50	19	31	30	18		46									
				_					,									_
Bedroom!		26	25-168	30	150		216	175	132					_				
B914 7x5x8 •		13	7- 56 4- 40	7	49		35 3	40	38									-
Bedrooms 135 x135 x 8	1250		17.136	18	17	_	156	28	91									_
Hall 56 x 5 x 8	220	_	5 <u>\$</u> 44		44		28		11									
TOTALS	8786	124		206	217	48	42	76	7/3									11

Fig. 2—Data sheet suggested by the author to accompany method. This article discusses selection of proper heat transmission coefficient and use of area tables to determine the heat loss without calculations.

### Technical Code-Precalculated [Part 3]

By Henry Aronson

Field Engineer, Premier Furnace Co.

H AVING obtained the physical data of the house under discussion in the last issue, the actual heat loss may now be obtained. At this point it will be necessary to refer to the Technical Code, the ASH&VE Guide, or other reference containing standard factors for heat and infiltration losses.

In the Middle West, heating plants are customarily planned to maintain 70 degrees inside when it is 10 degrees below zero outside, or for a total temperature difference of 80 degrees. This of course varies with different parts of the country. This difference is noted in its proper place in the heading of the data sheet (Fig. 2). The next step is to select the proper heat loss factors and enter them in their places at the tops of the columns. Selecting the factors requires a certain amount of good judgment and an adequate knowledge of building construction.

To determine the factors, the specifications must be referred to, or the actual construction observed. For the house being figured (Fig. 1, December), specifications call for double hung windows without weatherstripping and doors with weatherstripping. The infiltration for aver-

age double hung windows is 39.3 cubic feet per hour (from Table 4 of the Technical Code). For weatherstripped doors infiltration has been ESTI-MATED at 50 cubic feet per hour. Often doors and windows must be figured separately, but here the writer is using the same factor, 39.3, for both doors and windows. This simplifies figuring and in this case is justified, due to the fact that the difference is slight, and to the fact that adjoining rooms have an excess allowance for the same exposures. The factor, 39.3, is placed at the top of the column (crackage) as shown. It is well to give careful consideration to selecting the crackage factor to be used. In older houses, it may be considerably higher and on new houses, if the construction is poor and will loosen up quickly, this should be allowed for. If the estimator is familiar with the contractor's work he is in a better position to make a choice.

The next column is for glass area. The coefficient for single glass is 1.13, so this factor is placed in the glass column.

The outside walls are frame (siding, paper, sheathing, studs,  $\frac{1}{2}$  inch rigid insulation and plaster). The factor for this construction is .19,

201		1	_	000	RAC	KAG	E	e. PE				Squa	718	GLA	
of						on Fa	ctors					Feet	or C	oeff	
age 2	3.6 .	32 3	4.1 3	9.3	52 7	70 7	4 11	10.5	50 1	00 /	50	Are	a .4	25 .7	+
	_		E	=	-	=	_	Ē		E	10	E		-	E
-5			F	-5	-	-10	=10	E-10	-	-10	20	E	-5	-	-
-10	-	-5	-5	E	-10	- "	=	-20	-10	= 20	30	E	_10	-5	E
/5	-5	_	_	-10	_	-20	-20	= 30	-	=	-40	E	_ 15		E
- /3	-	-10	-10	E	-	-20	-	E	F	-30	50	E	20	-	-
-20	F	E	F	-15	-20	-	E	=40	+	E-40	60	E	-20	-10	F
_25 -	-10	-15	-15	E		- 30	-	= 50-	-	=	70		_25	_	E
=	-	-	-	- 20	-	=	40	E-60	-	-50	80	E	_ 30	-	E
30		-	-20	=	-30	-40	-	E	-30	-60	90	E	_35	-15	E
-35	-15	-20	-	-25	-	F	_50	E-70	E	E	100	E			E
-40	-	-	-25	_	F	-50	=	-80	-	-70	-110	E	40	-	F
- 05	-	-25	-	_ 30	-10	-	-60	-90	-10	-80	-120	E	45	_20	E
-45	-20	E	_ 30	= 35	-	-60	-	Ē		E _	130				E
-50 -		-30	-30	35	F	-	-70	-100 -	-	90_	140	E	_50 _	-	F
-55	-	-		- //0	- 50	-70	- 10	E-110	-50	-100	-150		-55	-25	F
_	-25	=	_35	-40		-	-80	-/20		Ē	160	E	_60		E
-60	-	-35	E	-45	- 60	-80	- 00	= 120	-	-110	170	E		-	E
-65	F	-	-40	= 75	- 60	-	-90	130	-60	-120	180	E	-65	-30	E
-70	-30	-40		-50		-90	= /	=140		=	-190	E	-70		E
	-	E	-45	=	70-	E	E 100	-150	-	130	-200	E	_75 <b>—</b>	-	E
-75 -	_	-45	E	-55	- 10-	- /00		Ε .	-70	-140	210			-35	E
-80	- 26	=	-50	E	-	-100	=110	-160	=	E	220	E	-80		E
-85	-35	-	-	-60	-80	-	-	_170	-	-150	230	E	-85		-
		-50	-55	E	_	-110	- /20	180	-80	-160	240	Ē	-90	-40	F
-90	-	=	-	-65	-	_	-/20	-100		-	250	=		_	F
-95	-40	-55	-	=	-90	-120	-130	-190	F	=170	260	E	-95		E
-100 -	-	-	-60	-70	-	-	-130	_200 —	90	-180	270	E	-100 -	-45-	-
	-	-60	_	=	_	130	- 140	_	-	E	280		-105	=	-
-105	-45	_	-65	75	-100	_	-	=210		-190	-280 -290	E	-105 -110	-	
-110	-	-65	-	= 0.0	_	-140	-150	=220	-100	-200	300		-110	-50	F
-115	_	-03	-70	-80		E	-		-	= 2/0	310	=	-115	_	
	50	_	_	- 95	-110	-150	- 110	Ξ	E	-210	320		120		E
-120	-	-70	-75	-	_	-	-160	<b>-240</b>	-110		330			-55	E
-125		=	-	- 90	-	- 160	- 170	-250 -	-	= 220	340		_/25 _	-	-
-130	-55	-75	-80	=	-/20	_	= "	-260					-/30	_	E
-135	-	=	_	-95	_	-170	-180	=	-120	-240	360		-/35	-60	E
_	_	-80	-85	=	-/30	=	- 700	<u>270</u>	F	-250	370 380	=		-	-
-140	-60	- 00	-	_100	-	-185	-190	-280	=	=	380	E	-140	_	E
-145	_		-90	=	_	- 703	= "	290	-130	_	390	=	-145	-65	E
-150 -	-	-85	- 70	-105	140	-		=	-	270	400	=	_/50 -	-	=
=	-65	_	=	=	_	=/90 <sup>-</sup>	-	300	-		_	=		_	E
-155	_	-90	- 95	-/10	_	_	-210	= 310	-140		420		155	-70	F
-160	-	-	-	=	_/50	200	-	- 320	-	- 290	430		-160	_	F
-165	-70	-95	-100	_115	_	=	_ 220	_	-	E	140	=	-165 -170	-	E
	-	-	-	- 120		-210	-	=-330	-/50	300	450		170	-75 -	E
-170	-	-	-105	-120	_160	-	-230	340	-	= 310	460	=	_///	_	E
-175 -	- -75	-/00	-	-125	-	-220	- 20	350	-	E -	470	=	-175 -		F
_/80	-	=	-110	- /23		_	-240	E	-160	320	180	=	-180	-80	E
_	_	-105	E	-/30	-170	-230	F	-360 -	_	330	490		-		E
-185	- 00	_	-115	= 130	_		_250	= 370	-	=	-500	=	-185	-	E
-190	-80	-110	_	-/35	- 100	_240	=	380	-170		510	Ξ	-190	-85	F
-195	_	_	- /20	=	-180	E	260	=	_	- 350	-520 -530		_195		E
			-/20	-140	-	_250		390		360	-530	=			F

which is placed in the net wall column. (From Table 3, Construction 1-b, Technical Code.)

ent "U"

40

50

-70

80

-100

-130

-140

-160

-180

-190

-200

The next column is for exposed floor area. On forced air jobs, the basement gets some heat from the furnace and piping, but not sufficient to consider the basement as heated, unless it actually has heat openings. In automatic heating plants where a butterfly type of automatic draft regulator is used, the temperature may be lowered considerably. In the case of the house under discussion, with an unpartitioned basement and a handfired furnace, a basement temperature of 55 degrees may be assumed.

The factor for a double floor on joists is .34. (Table 3, Construction 23, Technical Code.) The temperature difference between the basement at 55 degrees and the house at 70 degrees is 15 degrees. Technically the temperature at the floor would probably be 65 degrees, but it is best to ignore this variation. However, this job is being figured at an 80 degree differential, whereas this exposure has only a 15 degree difference.

It is possible to make a separate calculation for this exposure, but for practical purposes it is better to correct the factor for an 80 degree difference. This is done by working out the proper ratio, which is

$$\left(\frac{15}{80} \times .34;\right)$$

where 15 is the actual difference, and 80 the design difference, and .34 the factor. This results in a net factor of .064. As factors under .08 are never used, this factor, .08, is placed in its proper place, at the head of the floor area column.

The ceilings have 35%-inch Rockwool insulation. The factor for this is .08 which is placed in the ceiling column. (Table 3, Construction 16-D, Technical Code.)

For the attic wall, the factor for an interior partition wall with ½-inch rigid insulation and plaster is .35. (Table 3, Construction 14-B, Technical Code.) According to Table No. 1 of Article No. 3 of the Code, this would result in a cool side temperature of 19 degrees. This would be a difference of 51 degrees. Following the same process used in the case of the floors, the net factor would be

$$\left(rac{51}{80} imes .35
ight)$$

= .223, or .22. Worked out in the complete ASH&VE formula for combinations, the factor would be .196, so in this case the code's method provides a safety margin.

After the factors are properly entered on the Data Sheet the losses may be found on the charts and written in. Fig. 9 combines the crackage factors and glass factors. There are two sep-

arate vertical scales; one for lineal feet of crackage at the left and one for square feet of glass somewhat to the right of center. The scales line up with each other and may be used as guides for the straightedge. The infiltration factors are at the top of the crackage columns and the coefficients of transmission are above the glass columns. Crackage factors are expressed in terms of cubic feet of infiltrated air. This latter is multiplied by .018, the amount of heat necessary to raise one cubic foot of air one degree. In the crackage chart, these have been combined, so the result is given, directly in BTU per hour, per degree temperature difference.

These charts are used in the same manner as the other charts. The feet of crack for doors and windows was calculated and entered on the Data Sheet shown with Article 2, December. Using the living room as an example, and taking the crackage scale first, read horizontally from the 39-foot indicator (the living room having 39 feet of crackage) on the vertical scale to the 39.3 column. This shows slightly under 28 BTU per hour, per degree temperature difference. The 28 is placed below the line in the crackage space opposite the living room as shown on the data sheet. The same is done for the other rooms.

The glass loss is found similarly. The living room has 48 square feet of glass area. Reading from the 48 foot indicator to the 1.13 factor column shows 55, which is entered in the space provided. Note that on all the charts, where necessary to prevent crowding, the spaces on the columns count for two in results. The other rooms are treated likewise.

### Heat Loss Chart, Precalculated

Fig. 10 (Page 120) is for walls, ceilings, and floors and also reads in BTU per hour, per degree temperature difference. It is used in the same manner as the other charts. In this case there are identical indicating scales at each side of the chart, to simplify lining up the straightedge. The living room has 393 square feet of wall area, but the scale only reads to 200 feet. In this case read across the 200-foot line to the .19 column which shows 38. Then read across the 193-foot line (200 + 193 = 393) which is 37. Adding 38 and 37 the total is 75, which is placed in the net area column in the living room space. This procedure is followed wherever the area is greater than the The other rooms may be read scale reads. directly.

The floor and ceiling exposures are read in the same way, using the .08 column. The attic wall results are read in the .22 column. There will be supplementary charts published later to include

(Continued on page 188)

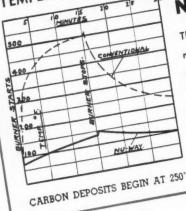


# OFFERS THIS OUTSTANDING SHIELDED NOZZLE

Approved

BY UNDERWRITERS' LABORATORIES, SUCCESSFULLY BURNS 34 GALLON OF NO. 3 FUEL OIL PER HOUR

### TEMPERATURE CHART



### NOTICE

This chart represents
nozzle temperatures
and shows how the
NU-WAY Nozzle
Shield keeps temperature below carbonizing point.

# What

### THIS MEANS TO EVERY OIL BURNER DEAL

As an oil burner dealer more and more you are being confront with the problem of installing oil burners in small, highly efficit heating units. The modern small furnace is provided with be plates and long fire travel—to increase its efficiency. It requires burning of smaller quantities of fuel oil which reduces the batack temperatures.

The NU-WAY SHIELDED NOZZLE (Listed by the Underwrited Burn 3/4 Gallon No. 3 Oil per hour) protects the oil burner not from the intense heat radiated from the flame. It is this high temperature that causes carbon and nozzle clogging—and make burners unable to use small nozzles.

For greater efficiency and successful operation, it will pay you install NU-WAY burners with these outstanding features — NU-WAY shielded nozzle (Pat. applied for); the NU-WAY Contro Air-Control (Pat. applied for); and many other outstanding features.

### **NU-WAY MODEL XL**



### WHAT THIS MEANS TO FURNACE MANUFACTURE

This outstanding NU-WAY Model XL Pressure Type Oil Burner, with the Shift Nozzle has been and is being developed to meet exacting requirements for warm air conditioners and small boiler units. We invite your interest.

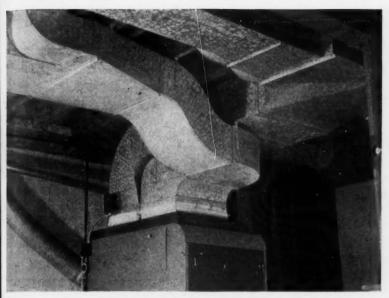
### WRITE TODAY

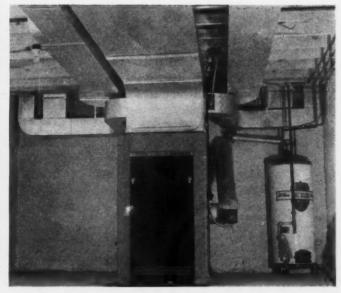
AND LET US TELL YOU MORE ABOUT THIS NEW ADVANCED MET exclusively developed by PU-WAY engineers to help you sell small succe automatic heat units.

THE)

NU-WAY CORPORATION

BOCK ICLAND ILLINOLO





Typical multi-duct installations and, below—a 16-outlet system. Seventy-five per cent of Columbia's installations are 16 outlets or smaller. The three photographs show the "standardized" duct construction. Mains and branches are built in widths multiple of 3½-inch stacks.

# Management Methods—in a 1,000-Forced-Air-Furnaces-a-Year Volume

By R. B. Barnes

Installation Manager, Columbia Specialty Co., Bethesda, Md.

COLUMBIA SPECIALTY COMPANY, Bethesda, Maryland, operating throughout Washington, D. C., and suburbs, will install in 1940 at least 1,000 forced warm air, winter air conditioning systems in new houses.

DEAL

confron

hly effici

with be

It requ

ces the

erwriter

urner n

is high

nd makes

pay you

Y Contro

th the Shi

ments for

CED MET

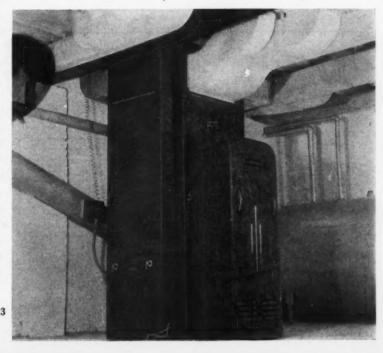
Most of these installations will fall within fairly narrow limits of house size, house heat loss, room arrangement, building construction and type of apparatus selected.

If this volume of installation was evenly spread throughout the year, we would have to complete over 80 installations every month—about three installations each working day. But when this volume is seasonalized by weather, by construction peaks and preferences, by sales of houses—the task of "managing" such an enterprise involves tremendous complications.

"Management" in this article does not refer to financial, sales, purchasing, organization affairs, but strictly to the problem of "keeping track" of all engineering, shop, installation and service operations. Such successful management must include the close cooperation of all departments involved: the engineering layout; the sheet metal fabrication, installation and supervision; the oil burner and unit installation, and finally, the service. As an organization grows the difficulties of inter-departmental cooperation increase, but

that is another story. This discussion deals only with the workings of a single member of this combination—The Installation of the Sheet Metal Duct Work on 1,000 Jobs a Year.

First let us examine briefly the type of system used. It is of the variety known as "streamlined" as opposed to the "extended plenum or tap." Approximately 75 percent of the installations have 16 outlets and 25 percent have 25 or more. Two sizes of risers are specified, an



AMERICAN ARTISAN, JANUARY, 1941 RESIDENTIAL AIR CONDITIONING SECTION 12

8 x  $3\frac{1}{2}$  and a 12 x  $3\frac{1}{2}$  and the basement trunks are made up in multiples of  $3\frac{1}{2}$  inch wide duct by 8 inches deep  $(3\frac{1}{2}, 7, 10\frac{1}{2}, \text{etc. x 8})$ . Standard or stock fittings are used in every instance possible (about 90 per cent) and the variety of fittings is kept at a minimum. This procedure makes for low cost fabrication and installation and simplifies the design problem. We also "standardize" registers and so far as possible use 8 x 6, 12 x 5, 12 x 8 flat and flange type horizontal adjustable registers and non-adjustable grilles.

#### Standardizing Pipe Work

All items are fabricated in our shop where a stock of all standard fittings is maintained sufficiently large to meet peak demands. Wall stacks are made of 28 gauge and basement trunks of 26 or 24 gauge, depending on width. A Pittsburgh lock, made on a machine, is used on all duct work and fittings with the exception of the stackheads and stack short-way ells which are spot welded. Stack head dampers, spotted into the stackhead, are used to reduce the balancing problem to a "one man job." A detail sketch shows our construction for this standard stackhead.

All duct work is made in 8-foot lengths and delivered to the job unassembled. Ducts up to  $10\frac{1}{2}$  inches wide by 8 inches deep are made as one piece with a single joint to cut down on required assembly time. Supply registers are located either in the baseboard, above the baseboard or 6 feet 7 inches above the floor in accordance with the builder's desire. Returns are in the baseboard. No basement outlets are included in the average 16-outlet houses, but the larger houses may have 3 or 4 finished lines. Essentially the system is "pre-fabricated" from fittings of our own devising, best suited to our own requirements.

Now to discuss in more detail the factors whose successful treatment makes possible the satisfactory installation of this number of jobs.

Mr. F.E. Westerplatz
1345 Kenyon St. N.W.

Equipment - CP2-2 Mueller
or
127-5 Quiet May

Note; No heat in Basement

Wall Stacks--- 10/5

Unit Set---- 10/25

Registers Mounted --- 10/26

Basement Completed--- 10/25

Fig. 1—The "Master Card" filed by the AC number is used to "keep track" of the job and shows the date on which the basic steps to completion are finished. These cards are removed from the file and the job "pin" is taken off the board when the job is completed.

When a contract for an air conditioning-heating plant is concluded by the sales department, a contract number is assigned and until a job is completed it is identified by this "A. C." number. A card bearing the builder's name and job address and including this number (see Fig. 1) is forwarded from the Sales Department to the Installation Department. This is the "master card" and is filed in sequence by AC numbers. As long as a job is active, this card remains in the files and can be referred to at any time for information regarding the status of the job and the dates of completion of the various stages. When a job has been completed in all details this card is removed to an inactive file in order to keep the active file as simple as possible.

A BA

10x314

As frequent reference is made to a job by the builder's name it is necessary to maintain a visible Kardex file in which all the jobs of each builder are listed alphabetically. This provides a cross index which speeds up the finding of pertinent information on any job. This file, like the master file, is kept up to date in order to

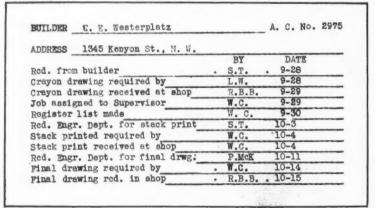
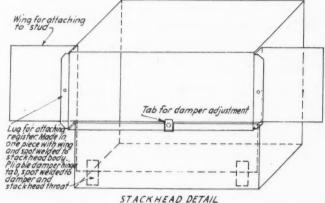


Fig. 2—Installation plan record card on which the location of plan is kept for reference. A duplicate card accompanies the plan as it moves between the departments.

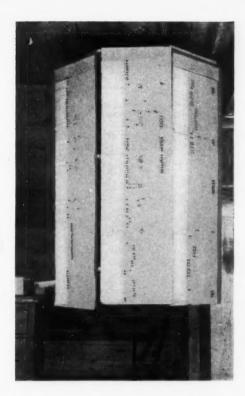


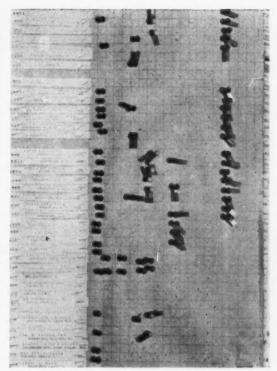
Design and construction of the "standard" stackhead used by Columbia. Note damper in head to enable one man to balance the job.

Right—The "Visible Status Board" and a closeup. This board is maintained in the manager's office. By use of colored pins the status of every job is readily seen. The primary purpose of the board is to tell the manager how much work of each kind must be done on how many jobs.

ay

Below—The shipping clerk must maintain a running job record of materials taken from stock or shop and delivered to each job. This is the record he maintains. This sheet eventually enters the cost analysis in the cost department.





have it as compact as possible.

Both of these files are absolutely indispensable. In addition it has been found extremely helpful to use a "visible status board." On this board is kept a day-by-day record of all jobs. The in-

COLUMBIA SPECIALTY CO., Inc.

BASEMENT MATERIALS DISBURSED

Deliver Thurs

A.C. No. 2571

Duite /2-22

Builder J.P. HENRY

Address /016-16 Th. St. N.W.

#HOD'S	ELBOWS																COST
SHOR	r WAY	1	_	-					C.	C. DU	CT					-	
Siar	Weld	Rd.Th	89.T	a Se	the	Caf.	600		8 a	314	-	1 m 2145		12 m 814	133	14 m 314	
8x334	12						6			)							
0x314										W. TA							
2x334	8	-	-	-					8 = 5	10 m	5	19 = 8	12 u 5	13 = 8	1335 a S	1334 m 8	
-	-0	-	-			-	-	-	-								
3141314	D WAT	-		_						W. TA		12 m 334	to 15 m 3	4   11	lig m 31g op	17 = 816	
Sine		i. The	1 1	iq. Th	11.		-				-	3	_	-			
8x334	4	3							C.	C. BOO	YTS					-	-
			-		-		-		Rise			30 m 5	0 m 0   E	m 5   12	m 0   131/m	5   1334mB	
2334			-						10								
1x314	_1									-		-		-	-	-	
14x34									3"		-	-				-	
REVER									50	1							
	8 x 35	1	n 8)4	. 13	n 316	133	1 x 316			UNK S			,				
н.									10 x 8-	10 ± 10	12 = 3	- 13 w 10	-		-		
L		-		-			_						1				
-		-		-		-	-		TR	ANSIT		n 316	1 .	7 m 364	( page	i u 364	
TRIPIN	TYPE	. (21	- 11 0 -			1			7.	-			1	- 2 49	1877	4.07	
FRUNK	4"	(Note	all 8"	Deep	18"	11"	13"		Date	CT (In	Feet					_	
		6		_	-	-	-		8 x			u 314	1 8	2 m 30 g	1904	m 816	
TOP T	AKE O		8'7	501	7-	1	-		3	4			-	12			
13 N	0 x 3	10 x 4	12 13			116 x 8	1314 x 4		Hang		8.8.	n D.C.		ış. İron	Base	PRODU	-
6			20	1					10	*		5.44		cs.		20#	
SIDE T	AKE C	FFS		_					Can. C					eletion		. Sata	-
B to 2016		10 x 3/5		12 m 3	16	1316	n 314		151	T			32		12	-	
1				2						CELLA	******		34		1 / 0	-	-
TOP T									MIS	CELLA	NEO	US					
	x 3 16	x3 1	**4	314	13 x 5	1354113	135500					-					
1																-	- 1
1													-		-	-	1
		-					-	-									
TOP TA	AKE O	FF RII	S (Par	Twe	20)		-	-									-
818		10 x 10	2 (Fai	13 x 1		1314 x	1396	-									- 1
							-										1
			-	-	1												
TRUNK	TOP	TAKE	OFF I	LLS													1
_											-		-				
NOTE																	
Any stor	ck fitting	having	no dan	sper i	n which	h damp	191										
Any stock fitting having damper from which damper						1					6	IIR T	OTA	L COL	2		
Any stor																	
Any stor	marked.	(-).	annipa		m with	damp									L COL		

stallations are posted in numerical order, 100 jobs to a board. Colored pins are used to indicate the various stages of the work and enable the observer to tell at a glance the general status of all jobs as a group. Blue pins indicate a completed stage, yellow pins with green tabs indicate that the unit has been set, etc. The manager can quickly estimate how much work is to be done within a specified time. In short, this board furnishes the installation manager with a summary of all work contracted for, complete or otherwise. Two photographs show this status board.

A set of architectural blue prints, furnished by the builder, is passed first through the Sales Department and then into the Engineering Department where a temporary or "proposed layout" is made in blue print pencil directly on the blue print. This represents the layout which the engineers consider to be satisfactory and as such is turned over to the Installation Department. Riser and register sizes are indicated and a single line drawing of how the basement duct work should be run is included.

### "Supervisor" Is Key to Field Control

When this plan arrives in the Installation Department a card is filled out in duplicate (see Fig. 2) and the plan is turned over to the proper supervisor by the manager. One of these cards is marked "Extra" and accompanies the plans whenever they pass out of the department. The duplicate card remains on file at all times, thus making it possible to tell the location of the plan at a glance. The supervisor takes the plans assigned to him and makes out in duplicate a list of the registers needed for the job. These lists

FI	NISHED MATERIALS DISBURSI	DELIN	ER	
A.C. No. 2571	Date /2-6	Tu	ES. 12	-7
Builder J. P. I	HENRY	Nº	3694	B
Address 1011 -	16th ST. N.W.			

MATER	IALS						NO. OF PIECES	UNIT	COST
9744	S. W	450	B. 1	W.	REV	ERSE   R. H.	-		
Elbows	-	-							
314 x 8	4	8		2		-	-		
3½ x 10									-
3½ x 12	2	2	2	6	-	-			
334 x 14									
Stackheads	WX	NDARD		WX	IZONTAL	вх	-		
8 x 6	12								
10 x 6									
12×5	3	2							
/2×8		1							
8'0' Length Du		8					14		
	31/2 >	10							
	31/2 x						12		
	31/2 x								
S Slips— 8" pip							68		
10" pip									
							34		
12" pip							37		
14" pip							104		
D Caps-31/2' p							102		
8" pip	e						211		-
Duct Hangers							24		-
Bar Iron			- 11		1/		NonE		
Angle Iron			2	×2"×	18		3 LGTH.		
		2-8				-	T. Sinn	-	

The architectural plans with crayoned layout are taken to the job as soon as building starts. (Reports of "ground breaking" and "pouring" are brought in by the salesmen in many cases.) The builder tentatively approves the layout including unit and oil tank location and basement trunk lines. The supervisor returns to the job at the laying of the first floor joists to assist the builder's foreman in providing the all important "joist spaces" necessary to run the lines according to plan. An attempt is made to get the foreman's permission to transfer, in crayon, the location and sizes of all risers to the foreman's plan. (This is done in order, in a gentle way, to force the foreman to notice the duct work and, by constantly reminding him every time he picks up his working plans, to provide necessary openings and spaces.) When the foreman will not agree to this procedure, the crayoned drawing is returned to the Engineering Department for a "Stack Print" which is returned to the builder as soon as possible. This print shows sizes and locations of all lines and includes any other data pertinent to the installation.

When the house is under roof the supervisor returns to the job, checks to see that all ducts are going in as shown on the plan; marks the location and sizes of all lines so that the "stack crew" can install the risers; sees that holes through floors, plates, etc., are cut; and notifies

Above—The shipping clerk also maintains this record of standardized and stocked items used on each job. The costs of these items have been figured previously by trial shop runs.

Right—Fig. 4—The Daily Work Sheet is made out by the manager each night and given the crew leader for his next day's assignments. The crew leader fills in what he did and turns the sheet back at the end of the day.

			D	AILY W	ORK SH	BET				
A.C DATE	294		_JOB_	JOHA SS 13	150N 25 M	oti	EST	inated Finish	TIME	2 Hrs
WALL	Attic lines	1,000,000	Lines	Reg.	List Sup-		10"	12"	14"	Odd Stres
Comp.	-	×	-	Low	Sup.					
BASE	Rough	to Dampe	Plens Hung		Unit set	Conn.	Rec.Rm.		Garas	e Lines Covered
Comp.	1	-		~					V	-
Incom			X		X	X	1	(		
CREW	LEADER	SMIT	H	CR	EW J	ONES	5 -	OSM	ANO	VITCH

are filed in the office and when the job is ready for registers one copy is available for the installation crew while the other copy is turned over to the Cost Department for entry against the cost of the job.

The job is now in the hands of one of the supervisors of which there are four. Each man has complete responsibility for all jobs assigned to him, from "Foundations" to "Bill for Completion." An attempt is made to keep each "Super" within a given territory, but fluctuations in the number of jobs contracted within a given area result in some overlapping.

the Department Manager that the job is ready to stack. When a crew is assigned, the supervisor returns to the job to make sure that the crew is doing its work and makes any notes necessary for the Engineering Department to complete the basement layout.

It should be noted here that all radical changes in the stack or basement layout are referred to the Engineering Department before final action is taken. This gives the original designer a chance to retain his ideas wherever possible and places responsibility for design in one depart-

(Continued on page 174)



Mail Coupon Today to PREMIER FURNACE CO., Dowagiac, Mich.

PREMIER

The Year Round Pine

PREMIER PURNACE CO.

Gentlemen -- Without obligation send me your 1941 Dealer Portfelle which describes your complete line, your complete program of dealer helps, and

Firm Name .

Street No.

Clarage Wheels can be furnished in tensizes and in a variety of widths in each size, thus meeting every capacity demand at any operating speed.

These Wheels are of the Double Multiblade Type as shown, built with two sets of perfectly formed blades securely anchored to the center plate and rims. Each Wheel is BOTH STATICALLY AND DYNAMICALLY BALANCED—quiet, smoothee from wibration.

Housings, too, in any of ten sizes can be furnished acrately where required.

Lan Wheels and Assemblies For Every Forced Air Heating and Air Conditioning Need



A Complete Fan, offered in ten different sizes, consists of a Clarage Double Multiblade Wheel, Fan Housing, Shaft, Bearings, Bearing Supports and Base. Bearings are self-aligning and self-lubricating; a bronze-graphite type which requires filling of the oil cup but once a season. The Shaft is of liberal size to insure ample strength and rigidity.

COMPLETE AIR CONDITIONING COOLING VENTILATION FACTORY HEATING MECHANICAL DRAFT **FANS and BLOWERS** 

INDUSTRIAL NEEDS

Complete Fans in the two smallest sizes, No. 1/2 and No. 5/4, are built

air inlet boxes can turnished as part standard equipment.

These Clarage Fans are of the positive centrifugal type, designed to deliver large volumes of air against the static resistance encountered in an air conditioning unit, or in the piping system of an air conditioning or warm air furnace installation.

They are built to the same standards of excellence which have made the larger Clarage air handling and conditioning products FIRST CHOICE of discriminating buyers the world over. Write for Bulletin 33.



DUPLEX FANS offered in ten sizes. Each unit consists of two Complete Fans mounted together on one base as shown above. Both wheels are mounted on one shaft turning on self-aligning, self-lubricating

All of these small Clarage Fans are EXCEEDINGLY QUIET IN OPERATION, when either V-belt driven or direct connected to motors. This silent performance is assured by SLOW SPEEDS, perfectly balanced wheels, and the use of highest-grade bearings.



Clarage Multitherm Conditioning Units (suspended and floor types) are ideal for retail stores, small restaurants, offices, etc. Furnished in various equipment combinations to give cooling. heating or complete air conditioning. Compact; easily installed! Ask for Bulletin 107.



CLARAGE FAN COMPANY KALAMAZOO, MICH

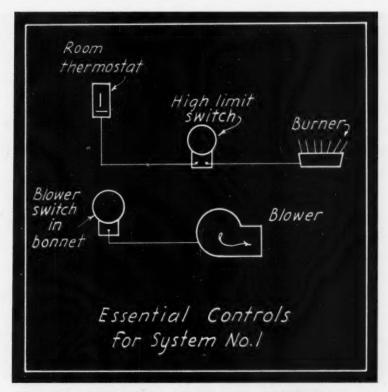


Fig. 1—The basic forced air control system in simplified diagram. All additional instruments are only safeguards or refinements, or economizers. In this system the thermostat starts and stops the fire, the fan switch starts and stops the fan.

# AUTOMATIC CONTROLS For Forced Air Heating Systems [Part 1]

By S. Konzo

Special Research Assistant Professor, Engineering Experiment Station, University of Illinois

It has been stated repeatedly that the control system is, in the final analysis, the "heart" of any forced warm air heating system. A well selected control system and instruments can make even a moderately good installation function better or, conversely, a poorly planned control system can make the very best installation operate unsatisfactorily.

al

st nn-

ce id

two

oth

ing

rced

nits

loor

etc.

ious

ina-

lete

om-

led!

Quite frequently, nowadays, a contractor will remark that control instruments and control systems have become so numerous and so complicated that only an electrical engineer can understand or install them. And from this has grown, seemingly, the thought that the heating contractor cannot hope to know much about controls and control systems and should, therefore, take what the manufacturer recommends without much question.

This attitude is not completely justified. True, we have many more types of instruments today; true this variety of instruments can be assembled

into a limitless adaptation of systems—but we still have only two basic control systems.

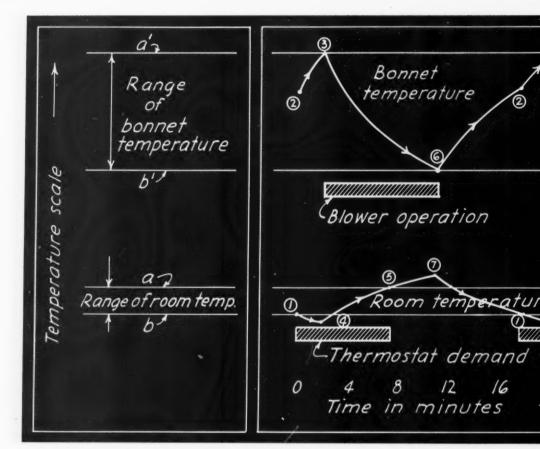
In this series of articles this statement will be explained and, for the sake of space economy, the discussion will be in the form of questions and answers.

### Control Types

QUESTION 1.—Isn't it true that we have more different types of controls and control systems now than we have ever had before?

Answer 1.—The answer to that question is both a yes and a no. It is true that we have a greater number of control manufacturers supplying controls specifically for forced warm-air heating installations, and it is also true that we have a greater variety of thermostats, elements, and so-called hook-ups. However, we do not have a greater number of control systems.

QUESTION 2.—I don't quite follow you. Only last



Left—Fig. 2—Showing average ranges of room and bonnet air temperatures. The room temperature range depends upon thermostat sensitivity.

Right—Fig. 3—Typical temperature ranges (bonnet and room) and length of fan and burner operation. Limit controls stop fan when bonnet temperature is low; start fan when bonnet temperature is high. The adjusted range of the instruments establishes high and low limits of temperature.

week I saw a pressure diaphragm type of control, and about one month ago I saw a new hook-up for a stoker hold-fire. Wouldn't you call these new control systems?

Answer 2.—To be specific, the answer is no. The controls which you mention are new controls, but they are not new systems.

QUESTION 3.—Well, how many different control systems are there? There must be at least 25.

Answer 3.—In the book, "Winter Air Conditioning—Forced Warm Air Heating," four fundamental systems are shown. But for all practical purposes there are only two.

QUESTIN 4.—Two! Why I can show you a single manufacturer's catalog that shows at least 8 different hook-ups. Just what do you mean by a control system?

ANSWER 4.—Now we are getting down to the fundamentals. A control system is a combination of devices that work together to bring about a definite sequence of operations of the blower and the burner.

QUESTION 5.—Do you mean to imply that a room thermostat is a room thermostat whether it is made by company A or B or C?

ANSWER.—Right.

QUESTION 6—And you don't attempt to distinguish between such differences in types as heat-anticipating, heat-accelerating, modulat-

ing, two-wire, three-wire, baseboard mounting, clock type, or any other type?

20

Answer 6.—Again right. They are all room thermostats as far as our discussion on control systems is concerned. Now don't misunderstand me. I am not saying that some room thermostats are not better than others. All I am saying is that a room thermostat is simply a device that attempts to maintain the room air temperature within some fixed limits.

QUESTION 7.—Well I'll grant that. I suppose then that to you a bonnet blower switch is only a device to operate the blower from the changes in the temperature in the bonnet? (Note: In this discussion the terms blower switch, bonnet thermostat, and bonnet switch are used interchangeably.)

ANSWER 7.—That's right.

QUESTION 8.—Well that is simple enough. Now where does the high-limit switch and the ignition cut-out switch and the hold-fire switch fit into the picture?

ANSWER 8.—As far as the fundamental control systems are concerned, they don't. The controls you mention are necessary components of a complete control installation, and to omit them might prove disastrous to safe and economical operation, but they do not enter into the normal functioning of the two control systems which I have mentioned.

### Control System No. 1

QUESTION 9.—Well, let me pass that question for the moment while you tell me what constitutes system No. 1. Can you give me a simple picture?

ANSWER 9.—Have you ever seen a control system in which the room thermostat controls only the operation of the burner, while the bonnet thermostat, or blower switch, controls only the operation of the blower? The simplified diagram is shown in Fig. 1.

QUESTION 10.—Why of course I have. Our company uses it for their entire line of furnaces. Now don't tell me that that is a system? Why

there is nothing to it.

Answer 10.—Of course there isn't. Now if you will analyze the way that the two thermostatic devices work together, you see that they can function only in a given way. Furthermore, we can set up every possible condition that a heating plant may have to handle, and we can predict with great certainty what the controls will do. The experience obtained with control systems in the Warm Air Research Residence has been confirmed by the experience of the heating men in the field.

QUESTION 11.—In order to make the explanation clearer, let us consider a concrete example. Suppose that in a gas-fired furnace installation, the room thermostat demands heat and the burner turns on. What happens after that?

Answer 11.—Now you will agree that the room temperature ordinarily varies between an upper temperature limit and a lower temperature limit, and that this range of temperature may be 1 deg. or 6 deg. apart, depending upon the thermostat sensitivity, and the adjustment, and one or two other factors. Let us mark these two limits by lines a and b in Fig. 2. We also have a normal temperature range for the bonnet temperatures, and we shall indicate these upper and lower bonnet temperature limits by lines a' and b'. We also have a normal temperature range for the flue gas temperatures, but for the sake of simplicity in this discussion, let us ignore that temperature range.

QUESTION 12.—Line a must correspond to the temperature at which the room thermostat is satisfied, say, 73 deg., and line b is the temperature at which the room thermostat demands heat, say 71 deg. Does that mean that the room temperature will never go below line b when control system No. 1 is used?

Answer 12.—Not at all. In Fig. 2, lines a and b indicate the temperatures of the room which cause the thermostat to either open or close the electrical circuit of the burner. Actually, with system No. 1 we may have a slight under-

run and over-run of room air temperatures.

Let me elaborate upon this statement, with the aid of the line diagram shown in Fig. 3. When the room thermostat demands heat (point 1), the burner begins operation and the flue gas temperatures begin to rise. The bonnet temperature rises from point 2 to point 3, at which temperature the blower begins operation. During this time the room temperature has decreased from point 1 on the lower limit to point 4.

QUESTION 13.—Is this temperature under-run large enough to be detrimental?

ANSWER 13.—Not in the case of heating plants which respond rapidly. For example, for most oil-fired and gas-fired furnaces the heat generation reaches a maximum capacity within a few seconds of time, which means that the bonnet temperature rises from point 2 to point 3 within a minute or two. During such a short period of time the temperature under-run, indicated by the drop in room temperature from point 1 to point 4, may amount to much less than 1 deg.

QUESTION 14.—What about the temperature under-runs for hand-fired coal burning furnaces

and stoker-fired furnaces?

Answer 14.—For coal-fired furnaces this system No. 1 is not as satisfactory as system No. 2, which we will discuss later. Usually the combustion pick-up of a coal-fired furnace is not as rapid as with gas-fired and oil-fired furnaces, and it may take longer for the bonnet air temperature to rise to point 3. In this case the longer time required may be accompanied by a larger under-run in room temperature, which may be large enough to be noticeable to the occupant, particularly in rooms having a large heat loss.

QUESTION 15.—What happens after the blower

begins operation?

Answer 15.—When the blower begins operation the bonnet air temperature decreases from point 3 to point 6, at which temperature the blower stops. During this period of blower operation the room temperature rises from point 4 to point 5, the room thermostat becomes satisfied, and the burner stops. However, since the blower is still operating at this time, the room temperature over-runs to point 7.

QUESTION 16.—Is this over-run of any serious magnitude?

Answer 16.—In the case of most gas-fired and oil-fired furnaces this temperature over-run may amount to only a degree or two, which is not noticeable to the occupant, and no difficulties are encountered.

If, however, the so-called "heat capacity" of

the furnace and the fuel bed is large, the overrun in room temperature may be much larger and may be noticeable to the occupant.

QUESTION 17.—In general, then, you think that system No. 1 is suitable for gas-fired and oil-fired furnaces, which do not have large heat-capacity.

Answer 17.—That's right. Furthermore, we believe control system No. 1 is not as good for coal-fired furnaces, as the second system, due to the large heat capacity of the furnace.

QUESTION 18.—What is the main advantage of this control system No. 1?

Answer 18.—The main advantage of system No. 1 lies in its simplicity. All that is required for normal, automatic, care-free operation is a room thermostat and a blower switch.

Another advantage of this system over system No. 2, which will be discussed later, is that for the same settings of the blower switch the blower will operate longer on any given day.

### **Auxiliary Devices**

QUESTION 19.—What about the high limit switch in the bonnet which stops the burner in case the bonnet temperature goes beyond a reasonable upper limit of, say, 175 to 200 deg. F.

Answer 19.—As I said earlier, a high limit switch is merely a protective device; its function is the same as that of a safety valve on a steam boiler. The high limit switch does nothing to control room temperatures during normal operation of the plant, but it is a very necessary device to safeguard the heating plant.

QUESTION 20.—Does the same thing apply to the use of ignition controls and hold-fire controls?

Answer 20.—Right. The instruments which you mention are all necessary in order to take care of emergencies.

QUESTION 21.—Do you see any objection to combining some of these protective controls so that they are contained in the same box with the main blower switch?

ANSWER 21.—Not at all. The particular arrangement of controls, relays, transformers, and connecting panels is for each control manufacturer to decide. If the manufacturer can combine more than one instrument into one box, the work of the installer is greatly simplified.

Briefly the main requirements for control system No. 1 consist of

- a. Room thermostat,
- b. Blower switch.
- c. High limit switch for the burner,
- d. Ignition control for the burner, or pilot light control for gas valve or hold-fire switch for stoker, and

e. Necesary relays and transformers.

QUESTION 22.—Speaking about connecting panels recalls the fact that some of the more recent furnace models have a much better arrangement of control mountings than others. How far do you think they can carry this?

Answer 22.—You have hit on a subject that we have been advocating for some time. I really believe that the furnace manufacturers give their dealers too much leeway as to the type of equipment they can buy from them. The standard line of furnace should have a standard set of approved controls as an integral part of the furnace equipment. In other words, when the dealer buys the furnace, he also gets the controls whether he likes it or not. If manufacturers would do that, a great deal of the difficulty we now have could be eliminated.

If the controls were standardized for any given furnace unit, then the succeeding step of building a control panel directly into the casing could be done. Our observation of the way in which the installers work has convinced us that the manufacturers expect too much from them. A good sheet metal man is not necessarily even a mediocre electrician. We would like to see the controls mounted on a panel and shipped as an assembled unit, said unit to be mounted on a specified place in the casing. Then an electrical cable, similar to those on automobiles, should be furnished with each furnace. The installer would simply have to connect wire No. 1 to terminal No. 1, etc. In other words, eliminate wiring diagrams, except merely as a reference to be used by an electrician. Personally I don't blame most installers from shying away from two-speed fans. The usual explanatory wiring diagrams and motor winding diagrams are enough to floor a competent electrician. I hope to see in the near future a tremendous amount of work done on this phase of manufacturing. If every furnace company had an iron-clad rule that everybody in that organization from the president down to the office boy had to set up one complete furnace job every year, we would see some striking developments in this field. We can make the jobs easier to install correctly if we scrap the present notion that the control system consists merely of a lot of unrelated units that have to be installed and wired to the best of the ability of the installer.

### Two-Speed Blowers

QUESTION 23.—I am glad you mentioned twospeed blowers. Since the usual two-speed blower operates from the bonnet thermostat (Continued on page 188)

# SHEET METAL



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING



The Friedens Lutheran School and Church at Kenosha, Wisconsin, where Mr. Egvedt's Company has just installed a 190,000 lb. warm air heating system. LOCKFORMER fabrication used throughout.



Offices and shop of the HOME HEATING COMPANY, Mr. I. O. Egvedt, President, (shown above). Lockformer equipment permits volume production yet requires little floor space.

Success in the Sheet Metal Contracting Business depends on two things; first, landing the contract, and second, making money on the job after you've gotten it.

Mr. Equedt tells us that his Lockformer 20 helped him to do both. Basing his figures on low cost Lockformer fabrication, he landed the 190,000 lb. installation mentioned above in the face of real competition. Equally important is the fact that savings effected by Lockformer methods resulted in a satisfactory profit on the job.

### THE LOCKFORMER 20



This is the model Lockformer used by the Home Heating Company. In service since July, Mr. Egvedt writes us that ". . . it performs just as smoothly today as the day it was delivered . . . hasn't cost a cent for either maintenance or repairs!"

Even a small shop, Lockformer equipped, is in a position to land big jobs . . . to handle them fast . . . to more than treble its volume without any increase in floor space. Because it pays for itself quickly and continues to earn big dividends for years to come, Sheet Metal Men everywhere say their Lockformer is the most profitable investment they've ever made! May we send you the name of the Distributor nearest you?

One man and a Lockformer can make more Pittsburgh Locks than sixteen men working at eight brakes.

THE OCKFORMER

ARTHINGTON STREET, CHICAGO, ILLINO!

### Three Identical Jobs-by Three Contractors

### and their

### Three Fabricating and Erecting Procedures

T HIS is the story of the methods used by three contractors, widely separated, to fabricate and install the duct work in three identical jobs.

The jobs are three of the four Regional Research Laboratories of the United States Department of Agriculture. The fourth laboratory—in Albany, California—has a simplified system requiring practically no duct work.

The three identical jobs reported are located in Peoria, Illinois; Wyndmoor (Philadelphia), Pennsylvania; and New Orleans, Louisiana.

siness

itract,

ou've

elped

Lock-

stalla-

ted by profit

0 1

The three contractors whose methods are reported are—Meyer Heating and Sheet Metal Division of the Meyer Furnace Company, Peoria, the Peoria laboratory; United Sheet Metal Company (formerly Quaker City Sheet Metal Co.) of Philadelphia, the Wyndmoor laboratory; Blattmann-Weeser Sheet Metal Works, Inc., New Orleans, the New Orleans laboratory.

The three laboratory buildings are identical—the ventilating and air conditioning systems are also identical—the air conditioning equipment is located and zoned identically and the duct work

required to distribute the air is almost identical in tonnage, arrangement, location and service.

Minor variations in fabrication occurred in turning vanes, fire dampers, access doors, splitter dampers—where the contractors were permitted to fabricate units according to their own preferred methods of design. Some other variation occurred in the section lengths into which return mains, supply mains, branches, fittings were divided for fabrication and erection and in the methods of reinforcing selected by the contractors.

All of these variations are shown in the sketches and drawings. Why the contractors divided the work as shown; why certain fittings were chosen; why the contractors preferred the special items shown; what advantages were believed obtained in methods and items—makes this story.

The comparison of methods extends throughout all the parts of the contract, but obviously, a completely itemized report would be too voluminous so the most interesting features wherein the three contractors differed most have been selected and will be compared.

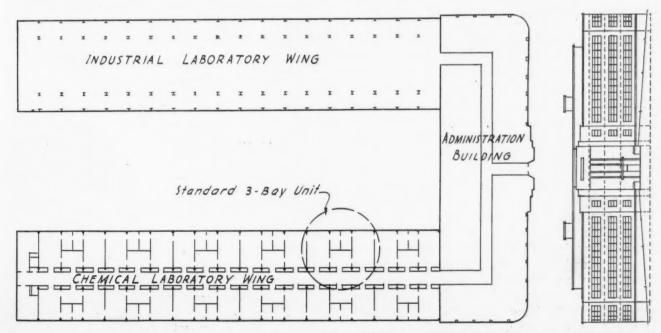


Fig. 1—Plan and elevation of the laboratories at Peoria, Wyndmoor and New Orleans. Air conditioning is provided in the Administration wing and the Chemical Laboratory.

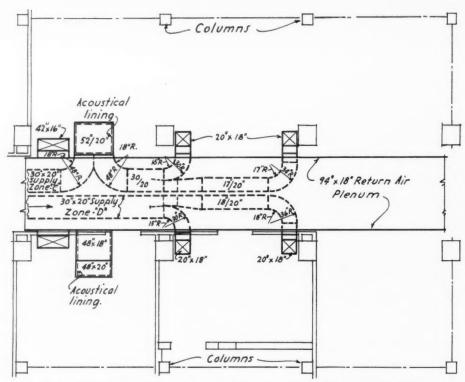


Fig. 2—Section in basement showing a typical air conditioning apparatus group; one half the conditioned air supply system leading from the apparatus and a section of the large return air plenum which runs through the basement. Each conditioning group draws its return air from this common plenum.

#### General Features

The laboratories are U-shaped buildings of three stories and a basement, divided into the Administration wing (front), a Chemical Laboratory wing and an Industrial Laboratory wing which will be a pilot plant for semi-plant scale process development (See Fig. 1). It might be explained that these laboratories are intended to discover and develop new and wider uses, and extended markets, for agricultural commodities and their products and by-products, especially those that are subject to surplus conditions.

The first, second, third floors of both Administration and Chemical Laboratory wings are air conditioned with year round control. Approximately 250 tons of refrigeration are employed. The distribution system is zoned and each zone has its own apparatus group in the basement. All recirculated air in the laboratory wing is collected in a large return air plenum (horizontal) running through the basement (see Fig. 2) and the supply mains serve risers which come up both sides of the corridor and connect with branches which supply individual spaces.

Fig. 2 shows this return main and sections of two zone supply systems in the Chemical Laboratory wing and Fig. 3 shows a riser and supply branches in one corner of the Administration wing. These are typical of all construction throughout the building. Attention is also called to Fig. 4 which shows a typical 3-bay unit. The Chemical wing consists of these 3-bay units strung

together and construction of the rooms, the equipment, the air conditioning system are virtually identical for all floors and throughout the wing.

### Return Air Plenum

One of the interesting comparisons in erection and construction occurs in the large return air pleum running through the basement. This plenum is uniform in section—94 inches wide and 18 inches deep (see Fig. 2) and regardless of how divided constituted a heavy section. Each of the

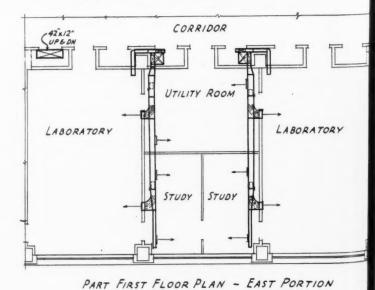


Fig. 4—The Chemical Lab. consists of multiples of these Standard Room Units. This plan permitted contractors to fabricate and install large numbers of identical right and left pipe sections.



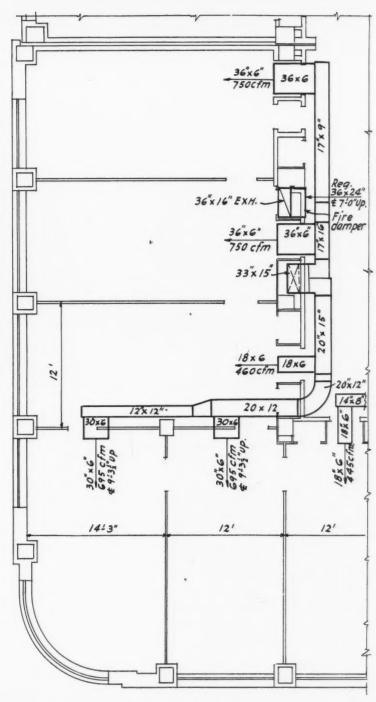
Blattmann-Weeser, New Orleans, used all possible time saving tools and methods. The mechanics are cutting pieces of elbows from flat sheets with electric shears. The cover of the Sheet Metal Section shows a Blattmann-Weeser mechanic closing a Pittsburgh seam with an electric hammer.

contractors divided this duct differently for fabrication and erection needs and each contractor constructed his duct somewhat differently.

Fig. 5 shows the construction followed by the contractors. The drawing shows the pieces used to form a section and the sections assembled to make the main as erected. It is interesting to note the pieces used to form a section. Meyer used eight pieces joined standing seam for stiffening; Blattmann-Weeser used only four pieces with corner Pittsburghs and a longitudinal angle stiffener 20 feet long riveted down the top and bottom; United used eight pieces but placed locks on corners, used double locked flat seams and ran a central hanger up through the duct.



The return air plenum in Peoria after insulating. The supply ducts run under the return. Compare with Fig. 2.



PART THIRD FLOOR PLAN-ADMINISTRATION BLDG.
SOUTH PORTION

Fig. 3—Typical riser, "T" and branch ducts in the Administration wing. The "T" is also shown in a photograph. Ducts in this wing occurred in multiple, standard constructions.

An interesting feature of this plenum was the methods used to get the sections into place. Fig. 6 shows two erecting ideas. Meyer constructed a scaffolding of heavy timbers, long enough to support three connected 8-foot sections. A special rigging was made to wrap around the structural frame columns as shown and from these four chain hoists raised the four corners of the frame. The three 8-foot sections were assembled on the frame, the chain hoists were pumped and the 24-foot unit weighing about 1300 pounds was

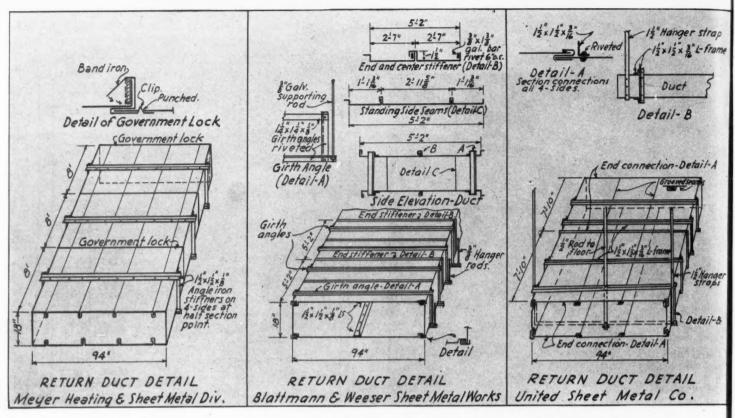


Fig. 5—Construction of the large return duct as developed by each of the three contractors. Each design was approved. The text explains how the fabricated pieces were assembled into sections and how the sections were erected.

raised for connection to the section already in place.

United built their sections as shown and assembled the sections without the use of any special equipment. Each section was made 7 feet 10 inches long and was assembled on the job and erected by slipping the lower, back edge of a full section into the S cleat, raising the front end above level, placing the hanger angle on the hanger rods and lowering the section to a level position. The other side and top cleats were then closed. Man-power did the lifting.

Blattmann-Weeser used still another idea. The 5 foot 2-inch sections were made up complete in the shop with angles, hangers, etc. as shown. One end of the section was inserted in the open pocket of the stiffened seam (see detail in Fig. 5). Then a quick running jack shown in Fig. 6 was placed under the near end and the section raised level to position and the seams closed. Such a section weighed about 275 pounds.

In all contracts this plenum is insulated with cork and all three contractors applied insulation to the top of the plenum before raising a section

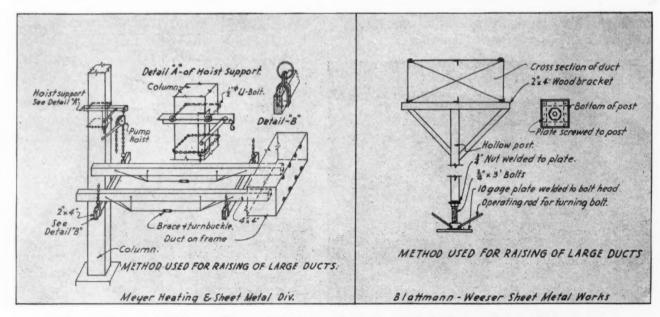


Fig. 6—Meyer and Blattmann-Weeser devised these interesting methods for erecting the heavy return duct sections. United raised their sections by man-power. The text explains these methods fully.

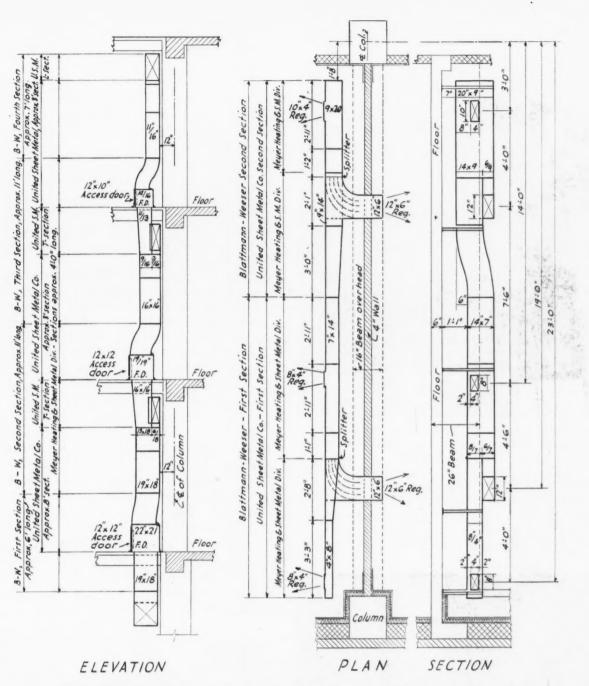


Fig. 7—Elevation of a supply riser and a Standard Room Unit branch in the Chemical Laboratory wing. The divisions selected by each contractor to facilitate fabrication and erection are shown. The text explains why these seletions were made.

into position and after the section was up applied insulation to the sides and bottom.

### Chemical Wing Branches and Risers

In the Chemical Laboratory wing the conditioned air from the apparatus in the basement is carried through 20 by 18-inch (approx.) risers located just inside the corridor wall and from these risers the branches for the standard unit of rooms is taken off. Fig. 7 shows how the three contractors divided the risers and branches for fabrication and erection.

Meyer divided their risers into the greatest number of sections making the divisions at logical section lines as shown in Fig. 7. Under this plan each fitting is a section; each straight length is a section. Meyer fabricated these sections complete in the shop and to speed erection developed the idea shown in two photographs. Government locks were used. A special notcher was made to cut the four corner notches in a straight, pre-formed pocket strip. The notched strip was then formed four sided, riveted at each corner and driven onto the riser section. From an old bolt cutter a special squeezer was made by putting two long jaws on the cutter and as one photograph shows this home-made squeezer speeding up closing the locks. By these means Meyer handled only short, light sections and con-

- frame

ail-A

tail-8



Photograph of the supply "T," Administration wing. See Fig. 3 for location. This "T" is in the Peoria building.

nections were made rapidly.

United made their riser divisions between floors with the lower section from the floor line (includes the fire damper box, see Fig. 7) to the bottom of the fitting having the branch takeoff.



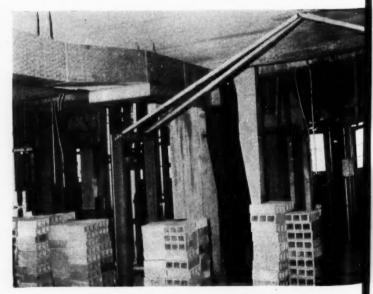
Blattmann-Weeser divided each branch supply into two pieces (see Fig. 7). The two pieces ready for delivery and connection on the job are here shown in the Blattmann-Weeser yard.

These sections were erected—bottom first, top second with standing seam connections.

Blattmann-Weeser erected their risers in a completely different manner. The lowest section just below the first floor was fabricated and joined in the shop to the section just above the first floor line which carries the fire damper. See Fig. 7. Then this assembly was lowered through the floor and connected to the basement fitting. Then the next assembly was made up from the first straight section, the branch takeoff section and the fire damper section for second floor (see Fig. 7) and this was raised up through the second floor and lowered slightly to connect. The same method was used for the second floor section and the third floor section.

Figure 7 also shows the horizontal branches which carry air to registers in the standard room unit. The sections into which the contractors divided these branches for fabrication and erection are shown on Fig. 7. Note that here all three contractors divided the branch into two pieces; composed of necessary fittings and sections; put the two pieces together on the floor and raised the full branch into position by man power. Meyer cut the register openings which have no elbows into the duct after erection; Blattmann-Weeser and United both cut these openings before the pipe was raised into place.

Referring again to Fig. 3 Administration wing it will be observed that the supply riser from the basement terminates in a large "T" from which supply air is taken two ways to registers which open into the rooms served from stub branches which stop at the corridor partition wall. While Fig. 3 shows a corner unit, the same "T" and same piping plan occurs at all other distributing zone units.



Supply riser and supply branch in a Standard Room Unit (Peoria). The black indicates insulation on the riser.



Above—Meyer devised a "squeezer" for closing Government locks on supply risers. The original tool was a bolt cutter. Superintendent Kapetanic is demonstrating. Right—Government locks were notched in a special set-up, formed and riveted and driven onto the pipe end.

Blattmann-Weeser fabricated the "T" and on the job connected the "T" with the two straight sections below and erected the assembly in position and connected with the section which passes through the floor. Meyer fabricated the "T" as one piece in the shop and made up the straight sections as single pieces. On the job these were all erected piece by piece to reduce the weight handled. United followed the same procedure as Meyer.

All three contractors assembled the horizontal supply branches (Fig. 3) into convenient sections and erected these assemblies from scaffolding. Fig. 3 shows how the stub branches which pass through the corridor wall made erection of a full branch length a rather difficult task and made shorter sections advisable.

Fig. 8 shows variations in splitter dampers used. Figs. 9-A and 9-B show fire dampers and



turning vanes used. Fig. 10 shows the access doors devised by the three contractors. The comparisons between types developed is clearly shown in the sketches. Meyer splitter dampers were very simple; United's were the usual rod, clamp and locking device but the locking device is especially good; Blattmann-Weeser's damper is elaborate by comparison with its two bracket bearings, two rod supports and the linkage used to adjust and set the damper.

The fire dampers varied considerably. The specifications called for these dampers at each floor level in all risers. Blattmann-Weeser used a heavy, single blade held open by the fusible link and falling shut on a spring catch and a back-up angle to the riser floor angle support. Fig. 9-A shows these details. Meyer and United both adopted multi-blade dampers. Meyer pivoted the louvres off center to reduce the weight required

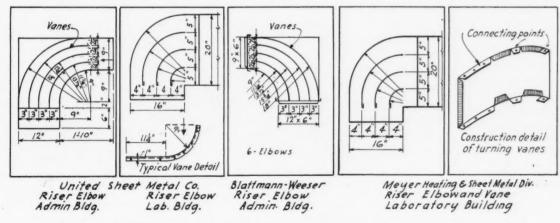
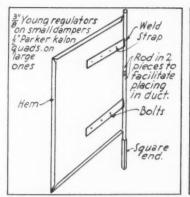
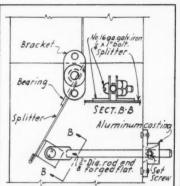


Fig. 9-B—Elbows, with vanes, in Laboratory and Administration wings. Radii of vanes identical, but vane construction differed somewhat, as shown.



MEYER H.E.S.M.Div. SPLITTER DAMPER SUPPLY RISER - LABORATORY



Duct width Bracket 0 0

BLATTMANN-WEESER- SPLITTER DAMPER IN SUPPLY RISER UNITED S.M.CO.-SPLITTER DAMPER LABORATORY BUILDING SUPPLY RISER-LABORATORY

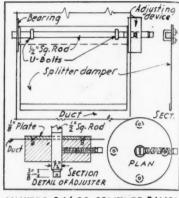
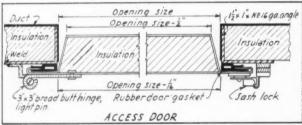


Fig. 8-A wide difference occurred in splitter Here are the three contractors' of what a good damper should be.

Insulation Access doo Sach lack straight hing ACCESS DOOR

Meyer Heating & Sheet Metal Div.



Blattmann - Weeser Sheet Metal Works

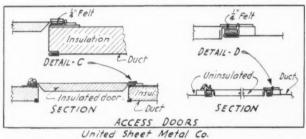


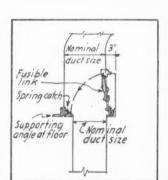
Fig. 10-Probably the widest difference in construction occurred in the access doors. are the three constructions.

to close the damper; United used balanced louvres with a weight to pull the blades shut. United also used a weighted blade in the riser dampers. See Fig. 9-A.

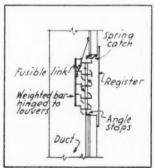
The turning vanes used in elbows throughout varied in minor details. In both Administration wing and Laboratory wing elbows the spacing and location of vanes were identical by all three contractors. The construction of the vanes differed slightly, mostly to obtain the most substantial riveting in the contractor's judgment. Fig. 9-B shows these similarities and differences.

Pronounced differences occurred in the design of access door recommended by the three contractors. Fig. 10 shows these doors; also the formation of the duct and insulation at the opening; the door framing; and the hardware selected.

While the air conditioning systems throughout the building account for most of the metal fabrication, there are other ventilating systems quite interesting. For instance, in the Laboratory wing each laboratory room (Fig. 3) has a special type of fully enclosed chemical hood. Each hood connects to an exhaust line which runs to a fan in the attic and thence out doors. Sixty such fans are used each handling about 500 cfm. Toilet exhausts on still other lines, running to fans in the attic.



Blattmann-Weeser - Fire damper



United Sheet Metal Co. Fire Dampers

Floor

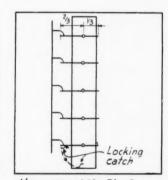
Hing

Duct.

Access

Weight

for retrieving



Meyer H.&S.M.Div. Fire Damper

Fig. 9-A—Fire dampers are located at each floor level. These are the dampers built by the contractors. It is notable that all dampers are excellent examples of a sturdy, simple damper and all were approved by government inspectors.



Falstrom executive, sales, engineering and office group together with a part of the shop force.

### Falstrom-Fabricators For 70 Years, Doubles Volume By Advertising

By R. C. Nason

O NE of the oldest sheet metal specialty manufacturers and industrial sheet metal contractors in the country is the Falstrom Company of Passaic, New Jersey. For seventy years this organization has been one of the largest sheet metal fabricators in the east—through good times and bad the company has produced specialties demanded by industrial customers and carried on a general sheet metal practice.

MPER

The list of items fabricated during these seventy years is almost a list of items manufactured of sheet metal. Ovens, dryers, tanks, trays, racks, gear guards, belt guards, machine guards, collectors, hoppers, enclosures, chutes, bins, baskets, cabinets, trucks, cabs, housings, counters and cases, hoods, panels, boxes, are just a partial list of Falstrom products.

### Advertising Brings Results

But in spite of this impressive history of service and in spite of this reputation for fabricating ability, Falstrom found in 1938 that a very large increase in volume could be handled—ought to be obtained, in fact, if profits were to be maintained. And so a selling campaign was started. Proof that the effort has been successful is indicated in the increase in the shop force from 80 to 148 mechanics; in the doubled engineering, office and



The variety of products fabricated by Falstrom is described and pictured in one of the new leaflets. The industrial user and the buyer of specialties are the targets for this mailing piece.



Ventilation is an important accessory to industrial production and Falstrom has manufactured and installed all types of ventilation systems. The pent house ventilator, described in one leaflet, is Falstrom's answer to one ventilating problem.

sales force; and in the erection of a badly needed addition of 3,200 square feet of floor space bringing the total floor area to about 30,000 sq. ft.

"It's like new wine in old bottles," said A. W. Lindholm, secretary and treasurer of the Falstrom company, explaining how the management feels about the present turn of things. He further explains that unlike some old concerns he and his brother, C. F. Lindholm, president and John Bekker, vice-president and general manager, do not intend to allow the revitalized organization to grow slack again. And that's just about what was threatening three years ago.

One of the first moves at correction was the formation of an advertising department which successively produced a series of four-page 8½ by 11 inch illustrated folders covering: 1, "Industrial Ovens and Dryers"; 2, "Miscellaneous Fabricated Steel Products"; 3, "Steel Enclosures"; 4, "Dust Control Units"; 5, "Air Exhaust Penthouses"; 6, "Machine Guards"; 7, "Good Air Is Good Business"; 8, "Steel Products for Industry"; 9, "Steel Industrial Panels and Cubicles"; 10, "Streamlined Steel Housings"; 11, "Barrel Lift for Handling Drums and Barrels."

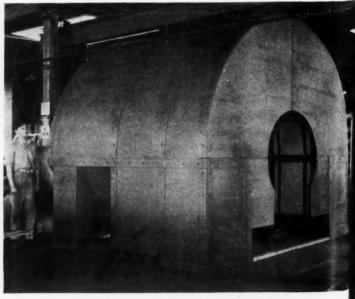
These bulletins and folders, have been mailed freely, have been taken around by outside salesmen and otherwise distributed. They began to pull. This indicated a need for increasing the selling staff. This was done and now numbers seven men including three graduate mechanical engineers. Their only instructions were "Go anywhere, but bring in some business in sheet metal work." All representatives are referred to at all times as "sales engineers," never "salesmen," since their activities do not include canvassing as much as solving industrial problems for Falstrom customers.

Passaic, situated in an industrial community, naturally, made sales effort productive among various manufacturers, textile and dye plants, ribbon and silk mills, shoe and rubber plants, asphalt and road materials yards; everywhere that heavy gauge sheet metal work might be found.

At least one effect of the revitalized selling work has been the standardizing on certain common (in this area) classes of fabricated equipment. For example, dryers, cabinets, roof exhaust fan penthouses, machine guards, heater and air conditioning jackets and casings, heavy steel plate equipment and steel sections. This sort of work now constitutes some 30 per cent of Falstrom's total business.

### Standardizing Used to Reduce Cost

The management would like to standardize fabrication still further if this proves feasible. Reasons contributing to this attitude is that standardization economizes on special engineering and drafting, economizes on pattern drafting, enables greater usage of "average" workmen, saves on installation time and labor, enables making models in advance of orders when convenient. Special work is always welcome, explains Mr. Bekker, but if a salesman can go out on a call, say from a button manufacturing plant and tell the cus-



Heavy steel enclosure for ball mills. Approximately 12 feet high.

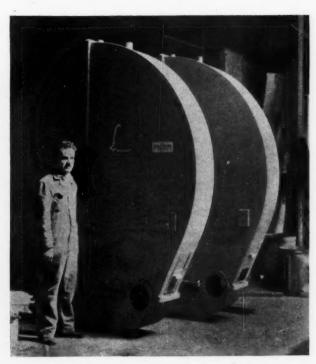
tomer he needs Falstrom Unit No. 3 and the price is so and so, then requirements are clear, shop and installation problems have ceased to be intricate, the plans and patterns already have been made and are on file.

## Heavy Gauge Work Increases

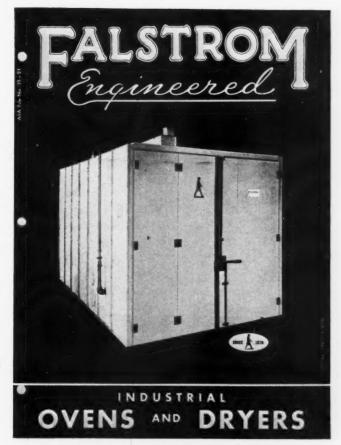
Falstrom has been increasing its heavy-gauge work of late. In fact, states Mr. Bekker, gauges of sheets specified seem constantly to become heavier. Special cabinets, containers, instrument panel boards, heater casings and the like are getting heavier. Just recently two large 10-gauge steel enclosures for "ball mills" weighing 2½ tons each, 10 ft. by 10 ft. by 12 ft. wide were made for a local manufacturer who will roll heavy steel balls around inside them to crush, pulverize and grind materials such as cocoa beans. (See photograph.)

Considerable heat is generated in this process. The noise when a ball mill is in operation is likely to be terrific. Hence a Falstrom engineer, studying the problem in advance of shop work, recommended insulating the interior of the enclosure with 4-in. of rockwool. This is held in place by a layer of steel extruded lath and the latter is made fast by bolting on some strips of 16-gauge steel as binders, or retainers.

Another typical heavy gauge item recently finished was the outer panel of an instrument board, 12 ft. square, in a single sheet with numerous holes here and there to take the faces of instruments like pressure gauges and electric current meters. This piece of steel to be manipulated in process of fabrication required the use of an



Falstrom-built heavy steel plate gear enclosure for pump manufacturers.



Industrial ovens, for drying finishes, are an essential in every manufacturing plant applying finishes. Falstrom will make almost any size or type of oven and describes ovens in this leaflet.

overhead electric crane and two mechanics. Other work of this general nature forced Falstrom Co. recently to purchase a new 120-in. electric shear with automatic push button control. (See picture.)

The foregoing represent a few of the many classes of work that are constantly passing through this shop. As a result of increased activity Falstrom now stocks 2 cars of angles, channels, bars, strip and such stock besides 5 cars of sheets in gauges up to  $\frac{3}{8}$ -in. thick. This year Falstrom will probably use 20 carloads of sheets for specialty production.

## New Space and New Equipment

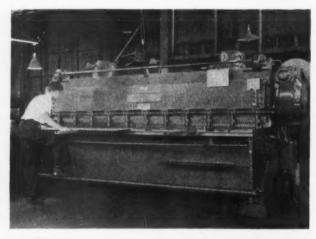
This year there will be about 178 men and women on the payroll, of which 148 are shop mechanics. This is one of the largest forces ever maintained as regular staff by Falstrom. Increased business and addition of new working space has required rearrangement of equipment in old and new space. In one end of the new addition is installed a complete machine shop. This section is known officially as the "heavy plate and guard" shop. Beyond is the older "general" division, while the end division, that nearest the shipping room, is the finishing and cabinet shop, with spray booths, crane, boxing and packing facilities where final touches are applied



Machine guards were one of Falstrom's first specialties. Guards of all types, in all gauges have continued to be a steady and profitable item. One leaflet is devoted to guards.

to most of the items regularly made ready for delivery. A feature of the shipping department is an electric wood saw for preparing suitable crating lumber.

A new electric crane was added to the new shop section, practically a necessity in handling metal sheets heavier than 18-gauge in large pieces. Another practice followed in connection with heavy plate work, as contrasted with light gauge work, is the use of large numbers of portable angle iron horses, also the general use of



New electric driven power shear with automatic controls and capacity of 10 feet, ½-inch steel plate made necessary by increased volume—particularly in heavy gauge work.

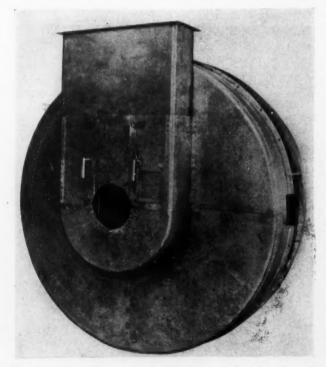
permanent casters and wheels under fabricating machinery. This reduces the amount of lifting and carrying of bulky and heavy work in process.

## "Specialists" for Specialties

Engineering proficiency is a well advertised feature of the Falstrom Co. Under the present organization there is: 1—A Sales Dept. of 5 Sales Engineers headed by A. W. Lindholm; 2—an Estimating Dept. with P. W. Kievit directing three estimators; 3—an Engineering Dept. of 6 engineers and draftsmen under H. S. Clark, Chief Engineer.

Following the receipt of an inquiry, the Sales Department sends required information to the Estimating Department for pricing. When the order is received, the necessary forms are made out, and all specifications and drawings are routed to the Engineering Department which puts the information in proper shape for shop fabrication. Working closely with the shop and all other departments is the Standards Department whose function it is to direct time and motion studies, determine operation costs, time and labor-saving methods and to put these methods and information into practice.

This organization system, with responsibility for each business operation definitely placed, is in conformity with modern economical production standards. The new system, in practice for about six months, has proved its worth by making possible more accurate cost control and more dependable job scheduling.



Heavy steel plate motor enclosure and hood. Overall height approximately 7 feet. One-quarter-inch plate cut, formed, welded by Falstrom.

## COME TO HEADQUARTERS

FOR AMERICA'S MOST COMPLETE LINE OF

## **AUTOMATIC GAS HEATING** PACKAGE SETS

EVERYTHING YOU NEED FOR AUTOMATIC, ACCURATE AND SIMPLIFIED CONTROL OF LARGE OR SMALL JOBS AT A LOWER COST

LOOK TO GENERAL CONTROLS FOR LEADERSHIP BASED ON YEARS OF TIME-TRIED AND PROVED PERFORMANCE

Ten years ago General Controls introduced the quiet, twe-wire, current-failure K-3B Solenoid Valve, making it possible for you to furnish a high quality, low priced, thermostatically controlled gas heating package set for all types of gas fired installations.

Three years ago General Controls introduced the B-60 Series all-gas actuated heating control, an amazing new departure in simplified gas controls, in which the pilot flame, by use of a pilot generator, supplies all electrical current necessary for remote thermostatically controlled operation. Utmost safety is provided by virtue of the fact that the entire control system is dependent on the pilot flame properly burning.

lay, because of the instant success of these

raduced at the right are three pages fro

Included in many of the package sets is General Controls' new T-80 Series Thermostat, the hit of the year for accuracy and good looks.

alves are available up to 6" I.P.S.

are's a good resolution for 1941: Come to adquarters for all your needs for auto-atic gas heating package sets.



## EX SERIES GAS HEATING PACKAGE SET

## EX SERIES GAS HEATING PACKAGE SET



## BX SERIES GAS HEATING TIMER SET

BX SERIES WATER HEATER SET

eveloped by General Controls for hot to the 230 F to the



## 8X.250 5/2.20 12.80 BX SERIES GAS CIRCULATOR SET





· CRICAGO - CLEVELANO - DETROIT - HOUSTON - KANSAS CITY - LOS ANGELES - NEW YORK - SAN FRANCISCO

## GAS HEATING PACKAGE SETS 7-30 · 7-60 · 7-40 · D-44

## T-30 GAS HEATING PACKAGE SET

LIST PRICES GAS CAR.



## T-60 GAS HEATING PACKAGE SET



REDETTER.

T-40 GAS HEATING PACKAGE SET



BUYER'S GUIDE TO AUTOMATIC GAS HEATING CONTROLS

Write for your complete copy of a new 48-page Catalog just off the press.



IPS PRICES ST FRISH DROP Includes D.4. Implifies Samples D.40 Imposts



11

ıt,



## GENERAL CONTROLS

267 Fifth Avenue, New York City • 687 Boylston St., Boston, Mass. 4515 N. Broad St., Philadelphia, Pa. • 1505 Broadway, Cleveland, Ohio • 6432 Cass Ave., Detroit, Mich. • 450 E. Ohio St., Chicago, III. 421 Southwest Blvd., Kansas City, Mo. • 598 Peachtree N. E., Atlanta, Ga. • 1100 Cadiz St., Dallas, Tex. • 25 N. Live Oak St., Houston, Tex. • 915 Bryant St., San Francisco, Calif. • 801 Allen Ave., Glendale, Calif. • Distributors and Stocks in all Principal Cities

## GAS HEATING PACKAGE SETS



8-60 SERIES

ALL-GAS CONTROL SETS





27 SUCCESSFUL YEARS . . . . AND STILL GROWING!

HERE'S TO

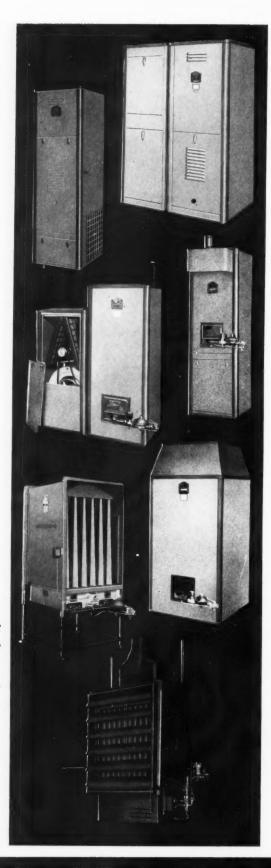
41

TO BE A
RECORD YEAR

FOR
"PACIFIC"
DEALERS!



BIG BUSINESS is ahead for dealers who are prepared for it. "Pacific" Dealers are in preferred position. Every gasheating requirement... type of unit, capacity, efficiency, quality, style, price... can be met 100% with the fast-selling "Pacific" Line, pacemaker for the industry!



"PACIFIC" IS THE

## PROFIT LINE

## DEMAND IS GROWING EVERY DAY

★ BECAUSE the "Pacific" Dealer has everything to work with, he can meet any specifications to perfection, handily beat competition!

Get the better business... the BIG, PROFITABLE business... that will come in '41 if you have the "Pacific" Line of gas appliances... the *complete* line of

FORCED-AIR FURNACES
FORCED-AIR UNITS
GRAVITY FURNACES
CONSOLE HEATERS
WALL HEATERS
GAS STEAM RADIATORS
WATER HEATERS
INDUSTRIAL
SPACE HEATERS

★ Many models in a full range of capacities, all of ultra modern operating efficiency and durably fine quality . . . built and guaranteed by one of the largest exclusive manufacturers of gas appliances. Write now for Catalog and "Pacific" Dealer Set-Up.

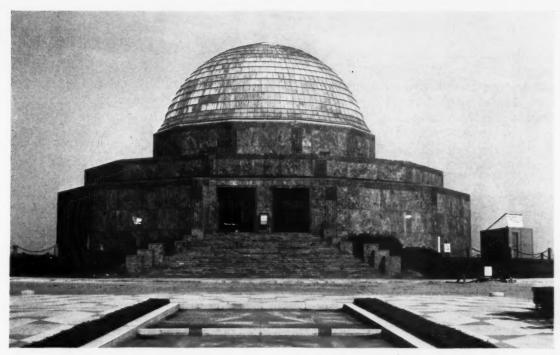


Fig. 1—The Adler Planetarium, Chicago, with the new lead coated copper dome completed. Reconstruction also included complete waterproofing of walls, parapets, copings, decks and structural joints.

## The Adler Planetarium— a Study in Water Penetration Prevention

By M. J. Glicken

Architectural Designer, Chicago Park District

HE Adler Planetarium and Astronomical Museum was constructed in the latter part of 1929 and the early part of 1930. It is a reinforced concrete and stone structure on wood piles. resting on land that had been filled about six years prior to its construction. The building is situated on a peninsula jutting out into Lake Michigan and is subjected to most severe weather conditions. There is a much greater range of temperature here than on buildings in less exposed locations. The nearly circular shape of the building enables the wind to develop high velocities against any portion and in heavy rains the water is driven against all structure joints with the force of a jet. These conditions make waterproofing of the building difficult, yet very necessary because of the delicate and costly instruments it houses.

The building had been showing evidences of leakage for a number of years since its completion, so in 1939 the Chicago Park District, which has jurisdiction over the building, decided to conduct certain experiments to determine the causes of the leakages.

By damming up the drains at the base of the dome and filling the gutters with water, it was found that in a short time water which could be seen from the catwalk appeared on the inside of the building. (See Fig. 3.) Also, by turning a hose against the wall that supports the dome, it was found that water collected on the inside on top of the concrete beam that was level with the promenade deck. (See Fig. 5.) When water was applied to the promenade deck parapet wall for a length of time, there again was evidence of water on the inside.

It was decided that the trouble lay in the fact that water was getting in behind the flashings, as described elsewhere in this article. Also, water which was able to work its way through the vertical joints of the copings found no obstruction and continued down through the wall. The latter trouble, it was thought, could be taken care of by the use of through wall flashing.

Some of the fault may have been due to unequal settlement in the building and the consequent tearing of the copper flashing in all parts of the building. This may have been true of the base

G!

ealith, ons

m-

the

ave

pli-

of

RS

bly

ıar-

ex-

ap-

log

and counter flashings, but with the dome proper, metal destruction was purely a matter of not allowing sufficiently for expansion and contraction. It was then decided to replace all copper work on the dome, to provide sufficient expansion joints and to do any other work necessary to eliminate all sources of water seepage.

Work was not started on the building until the latter part of April, 1940, since it was thought that this would be about the best time to do the sheet metal work. The temperatures of that season of the year range from 60 to 70 deg. F., which makes a pretty fair mean between the extremes of temperatures which the copper would finally have to undergo.

## General Building Construction

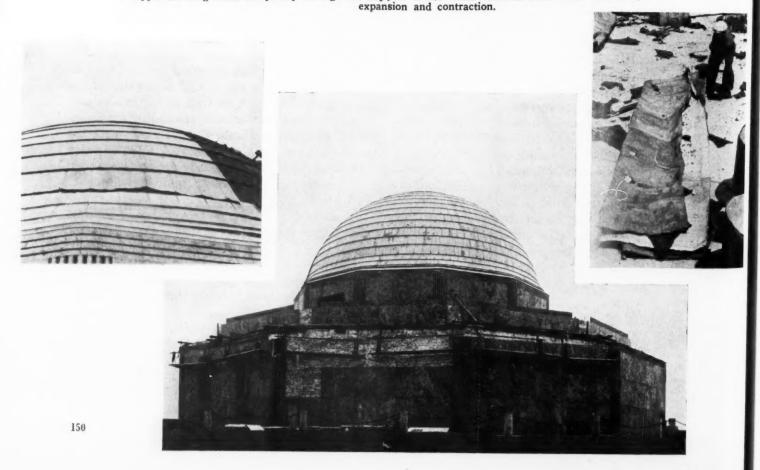
The walls of the building below grade are concrete, but those above grade consist of hollow brick 12 inches thick up to the lower deck level, 8 inches thick on the promenade deck parapet wall, and 12 inches from promenade deck to underside of dome. The entire building is faced with what is known as "Rainbow Granite" quarried in Cold Springs, Minnesota, and is generally about 4 inches thick, rough cut on the back, attaining in some spots a thickness as great as 12 inches. (See Figs. 5 and 6.)

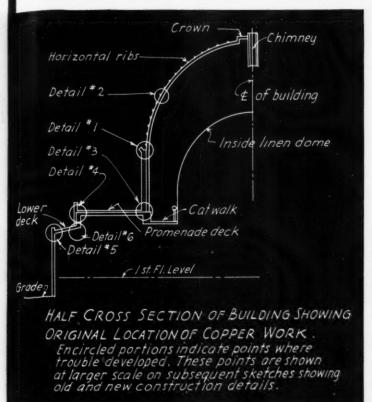
The dome is supported by means of twelve

steel ribs coverging at the top. These ribs carry horizontal purlins to which are wired lightweight. precast concrete slabs about 13/4 inches thick. These slabs are covered with 2 inches of cork placed between vertical nailing strips 13/4 x 13/4 inches and 13\(^3\)/4 inches on centers. In the original construction the cork was covered with a 30pound rag felt mopped on the underside and left dry on top to receive the copper. The copper, which was 16-ounce soft rolled, was applied in sheets approximately 30 inches wide and 36 inches up on the face of the dome. The vertical seams were flat, single locked and were staggered every 36 inches. The 36-inch dimension was established by the horizontal circular projecting ribs that occurred all the way up to within five feet of the top of the dome and were three feet apart. These ribs were designed to accent horizontal lines for an effect in keeping with the rest of the structure. The original construction is shown in Fig. 9 and Fig. 12.

When the general repairs of the building were undertaken, it was decided to retain these ribs in the installation of the new copper on the dome. The horizontal ribs were formed by means of wood strips cut to shape and nailed to the vertical sleepers and the copper sheets were formed over the wood and jointed at each rib at the outer edge by means of a flat lock seam. (Fig. 9.)

Fig. 2—Center—Dome before reconstruction. The dark areas are attempts to seal cracks in the copper with roofing plastic. Scaffolding used to waterproof walls where water penetrated between exterior stone and brick backup. Upper left—Old dome showing more patched areas. Upper right—Some old copper showing holes completely through the copper. These holes resulted from tears caused by





At the top of the dome where the pitch was almost horizontal, the original seams were soldered and were found in good condition. The only means of expansion, as nearly as can be determined, was at these horizontal ribs where the copper was separated from the wood strips, but the expansion could take place in a vertical direction only, since there was no give in the flat vertical seams. There were no expansion joints in the copper gutter and where the drains occurred the connection with the gutter was not watertight. (Fig. 6.)

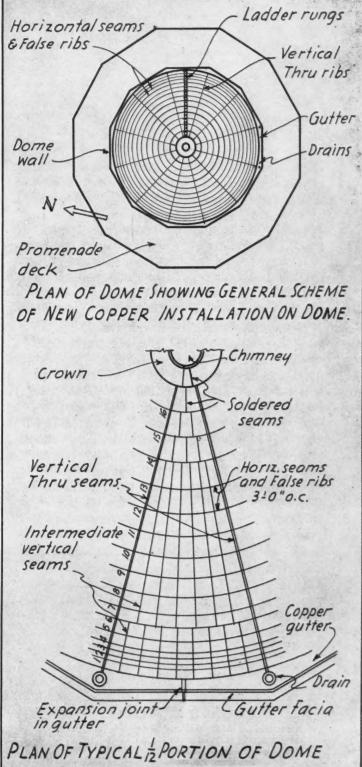
All over the upper half of the dome cross shaped cracks had appeared near the centers of many of the copper sheets. These had been coming on for the past few years and were found to be most numerous on the northwest side of the building. (Fig. 2.)

## Old Dome Without Expansion Joints

There can be no doubt that these cracks were the result of expansion. Since the copper dome was installed during cold weather, in the winter of 1929-30, the copper had to expand through the widest possible range and expansion could be expected to affect the north side of the building as well as the south. There was no provision made for any expansion or contraction in a horizontal direction and the expansion stresses accumulated until they reached a weak point which could naturally be the center of the sheet and there spent themselves. One can readily see that a continual repetition of bulging and straightening out would eventually play havoc with a sheet of copper and result in just such cracks as were found. The reason for the presence of the greatest number

Left—Fig. 3—Cross section through dome and wall with numbers indicating points where trouble resulted and reconstruction was extensive.

Below—Fig. 4—New dome construction showing segment between vertical through seams, sheet courses and sheets in a course, vertical and horizontal intermediate seams. Plan shows general 12-sided construction of the building. The old dome had no expansion joints—the new design has a through expansion joint at each corner.



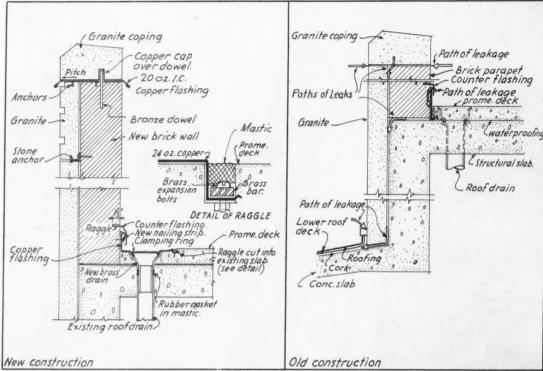


Fig. 6—Old and new construction at point 4 (See Fig. 3). Water entered through separation of cap and base flashing and passed down between veneer and backup; crossed the lower deck and entered the building as shown by the arrows. New construction used through wall flashing under copings and a better flashing application to seal out the water. A photograph of the new drain is shown in Fig. 7.

DETAIL - 4 - THRU-WALL FLASHING ON PARAPET AND DECK SLAB

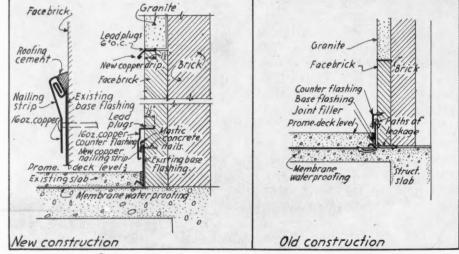
of cracks in the copper sheets on the northwest part of the dome was probably because this area is farthest from the ladder rungs that extend to the top of the dome. These rungs had continuous standing seams on each side of them extending to the crown of the dome, thus providing points at which expansion stresses could be relieved. There were very few cracks or sprung seams in the vicinity of these vertical seams.

It is difficult to attribute water leakage in a building to any particular portion of that building. It would certainly be impossible to trace a drop of water from its point of entry to the point at which it finally emerges into the open again. One can only form theories and proceed to plug the seepage at the source and leave no suspicious stone unturned. Example, the parapet wall (Fig. 6.) it appeared that the points of entry should be the vertical joints in the coping stones. Upon removing the stone, it was found that there was

evidence of water having lodged in the horizontal mortar bed and from there working its way into the vertical joints separating the stone from the brick backing. In order to find a way out, which it eventually must, the water continued over the roof slab, under the roofing and into the lower vertical wall, then out through the joints or into the building. (See Fig. 6.)

The promenade deck of the building is covered with cement slabs 4 inches thick and about 11 feet square. These slabs were originally poured with admixture to make them waterproof. Beneath the cement slab is a layer of membrane waterproofing laid over the concrete structural slab. The cement top slab is reinforced with wire mesh. (Fig. 5.) The joints are spanned at the bottom of the slabs with copper strips that were extended into the concrete and formed into the joint in the shape of a "V" to give the strips a bellows action. These joints were filled with an

Fig. 5—Old and new construction at rear rising wall of the promenade deck. See Fig. 3 for location of this point. Water entered old construction through a separation of cap and base flashing. New construction seeks to prevent this by wider flashing and fastenings which prevent the copper from being torn from the wall.



DETAIL - 3- JUNCTION OF PROMENADE DECK WITH DOME WALL.

elastic asphaltic cement which seemed to be in a fairly good state of preservation.

After making a few tests it was found that very little water came through the slab itself, and it was decided to leave it in place. Water did filter in, however, where the slabs joined the walls. Here was found a copper base flashing that was inserted into the top slab when the slab was poured, extended into it for a few inches and was then bent up on the wall and extended vertically for about three inches above the slab. The space between the copper and slab was filled with an elastic asphalt cement. Above this base flashing was a counter flashing that extended into the wall about 3/4 of an inch and lapped the base flashing two inches. The counter flashing was held into the mortar joints by means of small lead plugs and elastic compound.

The counter flashing in many places had come loose from the wall and so exposed the base flashing. By applying a hose to the base flashing it was possible, in a short time, to detect a seepage of water inside the building below the point of application. (Shown in Fig. 5 and Fig 14.) Since the base flashing was not fastened to the wall, continual expansions and contractions buckled it, so that it finally pulled away in many places. Any water that found its way between flashing and wall proceeded to trickle down into the inside of the building or out through a stone joint. (Fig. 5.)

The water that was found under the roofing on the lower roof deck was undoubtedly that which had found its way down from the upper portions of the building. Most of the water must have entered at the junction of the upper prom-

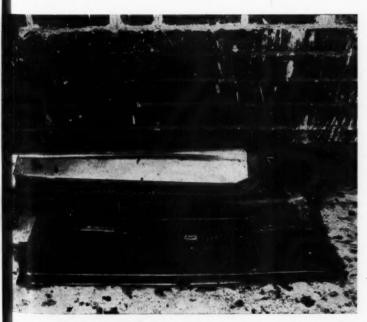


Fig. 7—Closeup of new drain construction at point 4. See Fig. 3 for location of drain and Fig. 6 for drain construction. Note width of new cap flashing.



Fig. 8—New flashing during construction. See Fig. 6 for construction. Note base flashing nailed to nailing strip and turned down and the width of the new cap flashing. Cap flashing was also inserted into the wall 1½ in. in place of original ¾ in.

enade level with vertical walls; that is, behind the base flashing, as described above. From there it ran down to the top of the structural slab, then under the parapet wall, and finally under the cork and behind the granite on the vertical walls. Thus it can be seen that in order to trace any seepage or leakage in any portion of the building, one had to explore places that seemed to be quite remote, to find the cause of such leakage.

## New Dome Construction

In applying the new copper to the dome, the same weight of copper was used as before, that is, sixteen-ounce, but it was coated on both sides with electro-deposited lead weighing fifteen pounds to the square. This was used because of its color and also because it was believed that it would be more durable, less likely to stain the granite and it has been proved to make a better soldered joint than the uncoated copper.

The general scheme for applying the new copper to provide adequate space for expansion and contraction consisted of installing vertical standing seams starting from each of the twelve corners at the base of the dome and extending in radial manner uninterruptedly to the crown. (Fig. 4.) This crown is ten feet in diameter, has vertical dimension of about a foot from the surface of the dome, and houses the chimney stack which is about five feet in diameter. The vertical seams extended up the vertical sides of the crown and were turned into a circular horizontal double locked loose joint. (Fig. 4.)

The sizes of the sheets vary from 27 inches in width at the base of the dome to about 15 inches in width near the crown. The height of the sheets remained at 36 inches, since it was decided to retain the horizontal ribs in the same location as before, but now the ribs are only false caps not

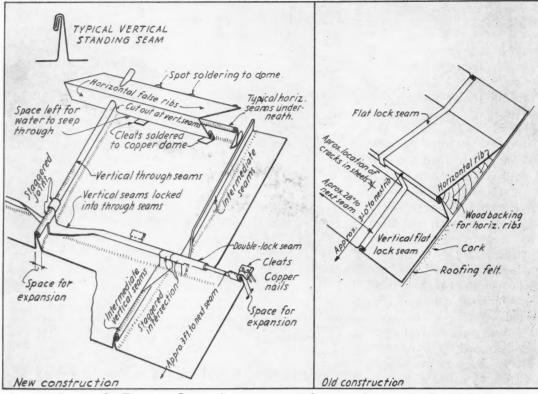


Fig. 9—Old dome construction showing integral "step" and seaming. These steps were continuous around the dome and were not broken by vertical expansion seams. In the new construction (left) the "steps" are only tack-soldered strips. Through, vertical seams are true expansion seams and the intermediate, vertical seams were locked loosely to provide additional expansion space. Note how meeting seams are folded together.

DETAIL - 2 - TYPICAL DOME CONSTRUCTION SHOWING LAYOUT OF SEAMS IN SHEETS.

integral with the copper sheets. The widths of the sheets were obtained by dividing the spaces between the twelve through vertical seams. Thus, at the base of the dome there were nine divisions between vertical seams. (Fig. 4.) About ½ of the way up, where the sheets were beginning to get too narrow, seven divisions were made and continued to within three courses of the crown. These were divided into 4, 3, and 2 sheets successively. (Fig. 4.) The last course being almost flat, has soldered seams between the vertical, through seams.

In general, there is no soldering of any seams on the dome, except at the crown where the surfaces are almost flat, inside the gutter, and in the attaching of the false, horizontal ribs. All the seams are double locked, standing where possible, and in all cases filled with white lead. They extend about 1½ inches above the finished surface

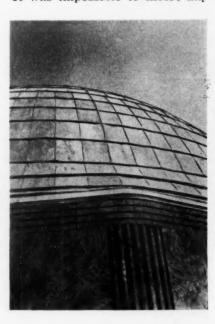
except where the pitch of the roof became too flat. There it was necessary to flatten the seams in order to allow the water to run over. In general, the horizontal seams are continuous around the dome except where they intersect the twelve radial seams. The intermediate vertical seams in each bay are staggered about two inches from the seam below and flattened just before reaching the horizontal seams. Then all the metal is double locked and left standing where the pitch allows it. (Fig. 9.)

In making the intermediate standing seam, care was taken to allow at least ½ of an inch clearance inside the base of the seam to allow for expansion and contraction. On the vertical through seams additional space was allowed. Cleats were made two inches wide and turned into all horizontal seams and vertical radial through seams. It was impossible to insert any



Fig. 10—Left—Closeup of new roof showing intermediate vertical seams and horizontal seams. Right—Looking up a thorough vertical expansion seam from a corner. Center—Sheets in a course were joined and laid complete by the crew.





cleats into the vertical intermediate seams since these would necessarily lift up when the horizontal seams were being formed. This was due to the fact that in making these horizontal seams, it was necessary to lift the copper sheets that were already in place in order to make the double locked joint with adjacent sheets and, in so doing, the cleats would be torn up and rendered useless. It was found, however, that because of the shape of the dome surface, the copper was sufficiently held in place by fastening into the horizontal joints only. Two copper nails were used to hold down each cleat, and these were nailed into existing vertical wooden strips. The metal was turned back over the copper nail head and malleted down. Where there were no existing wood strips, new ones were installed by cutting into the cork and nailing to the existing construction. (Fig. 9.)

In preparing the existing dome for the new copper, all of the old copper was torn off, a section at a time, in order to offer greater protection to the inside of the building. The old roofing felt was then torn off and a new jute fabric mopped onto the cork surface. A layer of thirty-pound felt was then mopped in over the fabric, with hot asphalt and the upper surface left dry to receive the copper. (Fig. 11.) It was felt that the roof beneath the copper should be made as watertight as possible to preclude any moisture coming through, should some leak occur in the copper covering.

The new horizontal ribs that occur approximately every three feet vertically up the dome are of the same size and shape as the originals,



Fig. 11—New gutter construction. Compare with Fig. 13 for metal application and connection between sheet courses.



Fig. 12—When the old copper was removed this is the way the gutter construction was found. Fig. 13 shows the old and the new backup and application of metal.

but they are merely false, horizontal ribs consisting of bent sheets of copper tack-soldered to the face of the dome and cut around all intersecting seams so as not to interfere with any expansion or contraction. They were also kept clear of the face of the dome to allow any moisture that gets behind them to run through the rib and out on the face of the dome. (Fig. 9.)

The two vertical standing seams that parallel each side of the ladder to the crown were replaced as before. These, together with the other twelve radial seams, should give sufficient flexibility in the entire dome and should be points of relief for cumulative expansion and contraction forces. The seams around the sheets, which are now smaller than before, should tend to act as points of absorption of stresses and prevent the sheets from undergoing undue buckling.

Before installing the new gutter at the base of the dome, all of the old copper was removed, including the old wood backing. This made it possible to install a copper wall flashing having one end inserted into an existing raggle in the top of the granite and caulked with poured lead. (Fig. 13.) The other end of the copper was extended back until it met the vertical wall, which formed the back of the gutter, then turned up about three inches and nailed to this wall. This completely sealed the top of the wall and an additional pitch to the front would enable any water that may get through the gutter itself to run out on the face

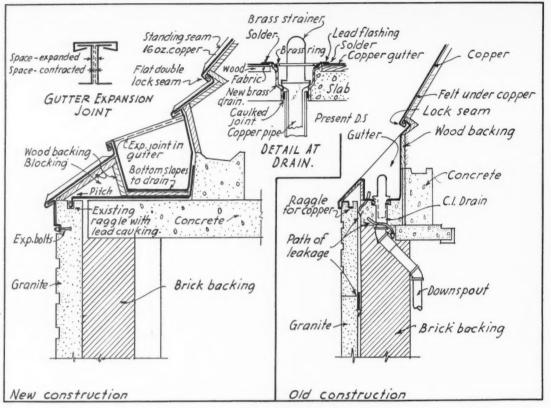


Fig. 13—Old and new gutter construction at base of dome. Detail 1, Fig. 3—shows the location. Paths of water penetration are shown by arrows. New construction is completely different. Note, especially, the application of a through flashing sheet UNDER the gutter to drain any leakage. Also changes in drips and horizontal seams to provide additional places for movement between parts.

tha

lin

tifu

cab

cus PE

REP

mair

mak

you

build

IND

DETAIL -1- TYPICAL GUTTER CONSTRUCTION AT BASE OF DOME

of the granite, instead of in back of it. (Fig. 13.) The new gutter backing was formed out of wood and covered with the fabric and felt, as was the rest of the dome. (Fig. 11.) The gutter was then ready to receive the new copper, which was placed inside the formed gutter and sloped in to allow a space between it and the gutter backing. The rear edge of the copper was double locked into the sheets extending up on the dome, and the front of the gutter was double locked over a facia piece that extended over the top of the granite. The gutter was split in the center of each section at the high points, the ends closed, and a piece of copper about two inches wide locked over the top, leaving a space between the ends of the gutter for expansion. (Fig. 13.)

Where the downspouts occur, the copper was cut around the perimeter of the heads and a heavy lead sheet was used for flashing. (Fig. 13.) This lead was soldered to the copper in the gutter and also to the inside of the conductor heads which were of brass and newly installed. The lead was then clamped in with brass clamping ring and screws. The brass dome strainers were then permanently installed. The seams in the gutter proper were double locked and soldered. The facia piece extending from the front of the gutter and over the granite was expansion bolted into a groove existing in the face of the granite. In forming the joint between the back of the gutter and the copper sheets on the dome, the vertical seams were flattened and all of the copper double locked and filled with white lead. There was sufficient room left in the seam to allow for

any movement up the face of the dome. (Fig. 13.)

Upon examination of the parapet wall on the promenade deck the unfailing signs of expansion and contraction were evident. There were numerous cracks in the brick backing, especially at the corners. These either followed the mortar joint or ran right through the brick. The brick was of a hard burnt variety set in a good cement mortar.

## Coping and Parapet Reconstruction

The granite coping was removed in order to dam up any points where water might enter. It was found that the granite facing had separated itself from the brick backing in many places attaining a separation of as much as 1/4 inch. This undoubtedly formed a place where water, coming in through the vertical granite joints, could seep in and escape on the outer wall. It was decided to remove the present brick backing for a distance of about two feet from the top and replace it. In replacing this wall, vertical expansion joints were put in it, two at each corner, that is, one on either side of the corners. These were made  $\frac{1}{2}$  inch wide completely through the wall to the granite facing and filled with an elastic joint filler. In this way any expansion and contraction in the wall around the promenade could be taken care of. (Fig. 8.)

Over the top of the wall and under the granite coping was installed a new twenty-ounce lead-coated copper flashing. This flashing extends about  $\frac{3}{4}$  of an inch beyond the wall on both sides.

(Continued on page 199)

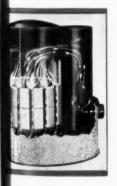


# Your Best Salesman... THE PEERLESS NAME AND complete LINE!

The best salesman is the product itself. If it bears a well-known and respected name—and actually gives more than it promises in service—then it sells itself over and over again. One sale leads to another. One satisfied customer tells his neighbor and thus a chain of sales is started that brings good fortune and profits to the dealer.... Such a name, and such a product is found in the PEERLESS complete line of heating equipment for 1941. Search where you will, you'll not discover a better line or a better proposition than PEERLESS offers you now. Write or wire today for our dealer proposition.

## YOU CAN SELL MORE BECAUSE YOU WILL HAVE MORE TO SELL!

Every dealer knows you can't sell what you haven't got. PEERLESS dealers have everything to sell that anyone can want. Starting with conventional, round, cast iron and steel furnaces that are outstanding values at lowest prices, the line includes all sizes and types of automatic heating units, for gas, oil or solid fuels, in beautifully streamlined, fully insulated baked enamel cabinets of unusual beauty. No matter what the customer wants, you have it, in the complete PEERLESS line! You need never lose a sale.



## Round Type Steel or Cast Iron Furnaces

The result of more than 35 years' successful manufacture. Each unit gives long life of service. Maximum fuel economy. Made in all wanted sizes. Prices are lower, with liberal discounts to the trade. No competition will have anything to beat or even equal these values.

REPAIR PARTS—PEERLESS manufactures and maintains a complete stock of repair parts for all makes of furnaces. Immediate shipment enables you to make quick repairs at lowest prices, thus building good will for future furnace sales.

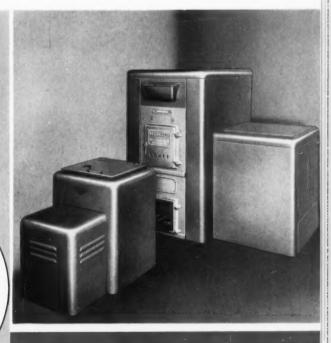
PEERLESS
FOUNDRY COMPANY
INDIANAPOLIS, INDIANA, U. S. A.

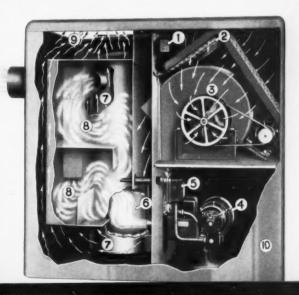
Latest design PEERLESS Streamliner steel furnace, complete with large, silent blower, filters, automatic humidifier. Truly a DeLuxe unit at a remarkably low price. Same unit available for oil or gas. Beautiful baked enamel finish. The stoker, too, is a PEERLESS. Quiet operation, real economy and dependability are guaranteed. Hopper or bin feed.



Here is another exceedingly popular unit in the complete PEERLESS line. A compact, streamlined colorful unit that heats, humidifles, filters and circulates. Designed for stoker or hand firing, it represents the latest developments in efficiency and in economical operation. Cabinet is rich, rust-resisting forest green Morocco baked enamel. A real sales maker for you.

PEERLESS MASTER Automatic Furnace for small and medium size homes. All previous records of efficiency and fuel economy are broken by scientific designing and sound construction. Note the compact simplified arrangement of all the component parts and the intricate maze of baffling in the big radiator that delays passage of flue gas to chimney.









# DIEPENDABLE CONTROLL

A-P Model 240-DR

Constant Level Oil Control Valve — Manually
operated.



A-P Thermo-Electric Heat Regulator Set for Heaters.



A-P Complete Furnace
Control Set Available in
Variety of types for
Gravity Oil Burning
Furnaces.

Shown above are a few of the A-P DEPENDABLE

Controls for Gravity Oil Burning Equipment.

Add Comfort, Convenience, Fuel Economy to Gravity Oil Burning Equip-

ment.

Heating efficiency and customer

Heating efficiency and customer

Satisfaction with the Gravity Oil

Heating Furnaces and Heaters

Burning Furnaces and Fuel and

you sell depend upon the Fuel and

Temperature Control to a great

extent.

A-P Dependable Controls help the manufacturer get all the efficiency he builds into his furnace or heater. They have protected Furnace Methrough DEPENDABLE services and elimination of callbacks. The have won the approval of have won the approval of Furnace Owners by their simplicity of operation and simplicity of operation fuel accuracy in controlling fuel and room temperature.

## The Reason?...

A-P Designers and Engineers work closely with Furnace Manufacturers on controls for every new model. They KNOW what you want in control DEPENDABILITY.

welcomes YOUR control problems — and promises a solution that will be both profitable and economical.

Write for latest bulletins

AUTOMATIC PRODUCTS COMPAN

MILWAUK

Separt Department

(D) WISCONS

## Product Finishing

## A Method For Determining Finishing Material Costs

By W. G. Sheane

Chemical Engineer, General Electric Co.

To BE entirely satisfactory, any method for determining finishing material costs must possess certain characteristics. Among these are:

- 1. It must be accurate.
- 2. It must be rapid.

on-

uip-

er

liC

ters

and

great

elp the

ficiency

heater.

nace Me

servi

acks. Th

d of

their

n and

ng fuel

work

n con-

what

re.

- 3. It must consider all of the factors influencing cost.
- 4. It must not interfere greatly with regular production.
- 5. It must be economical of materials.

The method described below fulfills these requirements. It is accurate because exact meas-

uring instruments are employed and the human element is reduced to a minimum. It is rapid, requiring less than four hours for the average analysis. It takes into account all of the factors influencing cost and gives reproducible results. It does not interfere particularly with regular production since the preparation of a few small panels is all that is required. Finally, it is economical of materials in that no costly production parts are used and only one quart of the finishing material is needed.

## Description of Method

The first step is the determination of the cost per gallon of the finishing material as it is ready to apply, that is, after reduction with the proper amount

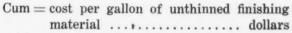
of thinner. This is accomplished through the use of the following equation:

$$Ctm = \frac{(Pum) (Cum) + (Pt) (Ct)}{100} \dots Eq. I$$

where

Ctm = cost per gallon of thinned finishing material ...... dollars

Pum = per cent by volume of unthinned finishing material in thinned finishing material



Ct = cost per gallon of thinner.....dollars *Example*. Three parts by volume of an unthinned finishing material require one part by volume of thinner to obtain the correct working properties, whence, Pum = 75.0 and Pt = 25.0. The unthinned material costs \$2.00 per gallon and the thinner \$0.60, that is, Cum = 2.00 and Ct = 0.60. Substituting these data in Equation I, the cost per gallon of thinned finishing material is

$$Ctm = \frac{(75.0) (2.00) + (25.0) (0.60)}{}$$

= \$1.65.

The second step is the determination of the possible area, covered to some definite thickness, which can be obtained from one gallon of the thinned finishing material. Equation II is employed.

$$A = \frac{\text{(W) (Ps)}}{519 \text{ (T) (D)}}.....\text{ Eq. II}$$

where:

A = area covered to thickness (T) obtained from one gallon of thinned finishing material ....... square feet

W = weight per gallon of thinned finishing material..... pounds

Ps = per cent by weight of non-volatile film forming

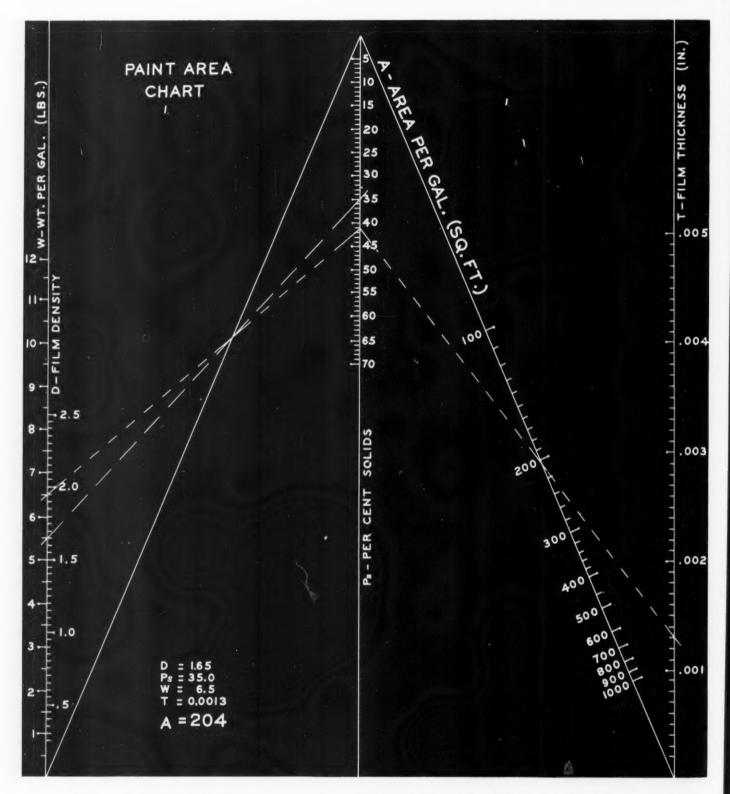
solids in thinned finishing material

519 = constant

T = thickness of cured film of finishing material ......inches

D = density of cured film of finishing material

Example. The finishing material referred to above has after thinning a weight per gallon (W) of 7.40 pounds and a non-volatile solids content (Ps) of 30.5 per cent. It is applied to give a



In place of Equation II, the above chart may be used to obtain the area per gallon. Use of the chart is as follows, using the data in the lower left hand corner of the chart as an example.

- 1. Draw a straight line connecting the values of D (1.65) and Ps (35.0). This line will intersect the sloping line located to the left of the vertical center line.
- 2. From the value of W (6.5) extend a straight line through the intersection obtained in Step I until it intersects the vertical center line.
- 3. Draw a straight line connecting the value of T (0.0013) and the intersection obtained in Step 2. This line will intersect the area per gallon scale at the value of 204 square feet. This result can be checked by substitution of the values in the lower left hand portion of the chart in Equation II.

Use of the chart eliminates all mathematical calculations required with Equation II.

cured film thickness (T) of 0.00196 inches. The density of the cured film (D) is 1.805. Substituting these data in Equation II, the possible area covered to a thickness of 0.00196 inches from one gallon of thinned finishing material is

$$A = \frac{(7.40) (30.5)}{(519) (0.00196) (1.805)} = 123.0 \text{ sq. ft.}$$

The third and final step consists of dividing the result of Equation I by that of Equation II. The material cost per square foot covered is,

05

004

003

002

001

therefore,

$$\frac{\text{Ctm}}{\text{A}} = \frac{1.65}{123.0} = \$0.01341 \dots \text{Eq. III}$$

It is understood, of course, that this final material cost per square foot is based on 100 per cent utilization; that is, no material loss. As such, in comparison with similar data on other materials, it can be used to select the most economical material for any application without the necessity for actual trials in the factory.

Typical Comparison of Two Materials

	Material A	Material B
Cost/gal. unthinned material	\$2.35	\$2.40
Cost/gal. thinner	\$0.24	\$0.24
Thinning ratio	2.5/1.0	2.0/1.0
COST/GAL. THINED MATERIAL (Eq. I)	\$1.75	\$1.68
Wt./gal. thinned material	9.59 lbs.	9.73 lbs.
Solids in thinned material	41.30%	42.41%
Cured film density	1.908	1.945
Cured film thickness	0.00125 in.	0.00118 in.
AREA/GAL. THINNED MATERIAL (Eq. II)	320 sq. ft.	346 sq. ft.
COST/SQUARE FOOT	\$0.00547	\$0.00486

It will be noted that, although Material B is more expensive per gallon than Material A, the final cost per square foot is lower. This is due to the lower thinning ratio, greater weight per gallon and solids, and lower film thickness of Material B.

## Procedures for Data Used in Equation II

W-weight per gallon of thinned finishing material

The weight per gallon of the thinned finishing material may be obtained through the use of an hydrometer, a Westphal balance, a pycnometer of the regular laboratory type, or a weight per gallon cup designed especially for use with finishing materials.

Ps—per cent by weight of solids in thinned finishing material.

Accurately weigh a small sample of the thinned finishing material into clean, dry and previously tared weighing dish fitted with an airtight cover. Remove the cover after the weighing and drive off the solvents by heating to constant weight at about 100°F. The weight of the dried sample divided by the weight of the wet sample and multiplied by 100 is the per cent by weight of solids in the thinned finishing material.

T—thickness of the cured film of finishing material.

Finish a clean flat panel with the material in the same manner in which the material is to be applied in production. Cure the finish on the panel according to the specifications of the manufacturer. The thickness of the cured film is obtained by subtracting the thickness of the bare panel, as measured with a micrometer, from the combined thicknesses of the panel and the cured film.

D-Density of cured film of finishing material.

Accurately weigh and measure the thickness and area of a clean flat panel. Apply a uniform coat of the finishing material on one side of the panel and cure according to the specifications of the manufacturer. Accurately weigh and measure the thickness of the finished and cured panel.

The density of the cured film of finishing material is obtained from the following equation.

$$D = \frac{\text{(w)}}{\text{(a) (t) (16.39)}}$$

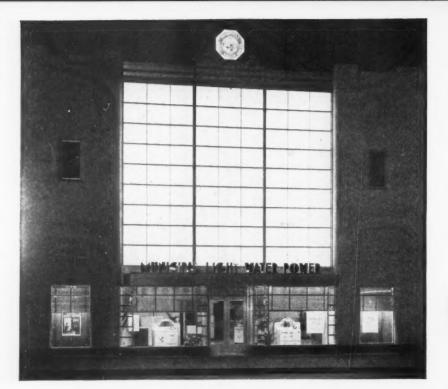
where:

 $\begin{array}{l} D = \text{density of cured film of finishing material} \\ w = \text{weight of cured film}.....\text{grams} \end{array}$ 

t = thickness of cured film.....inches a = area of panel.....square inches

Example. A coat of finishing material of uniform thickness is applied to one side of a clean flat panel measuring  $10.0 \times 4.0$  inches, whence, a=40.0 square inches. The bare panel weighs 30.151 grams. The finished and cured panel weighs 34.330 grams. Therefore, w=(34.330-30.151)=4.179 grams. The bare panel measures 0.0471 inches and the finished and cured panel 0.0520 inches. Therefore, t=(0.0520-0.0471)=0.0049 inches. Substituting these data in the density equation,

$$D = \frac{(4.179)}{(40.0) (0.0049) (16.39)} = 1.302$$



# The wall on the wall

Hollow sheet metal letters faced with slabs of dark blue opaque glass give a modernistic effect to this utility show room and office building.

By A. B. Laing Hollywood, Calif.

W RITING on the wall—as California does it—is not just a figure of speech—but a very effective idea in adopting large sheet metal block letters to signs which are lighted from behind and thus appear black at night against the light colored flood lighted wall. Tons of these galvanized iron block letters are now being consumed by Los Angeles and San Francisco business houses. It looks as though these townsfolk, who have popularized so many fads and fashions in the past, are now preparing another boom for the sheet metal craftsman.

It started quite recently out there. But already a brisk demand for metal silhouettes on store fronts is moving east, with the prospect of some nice business for the trade. Steady business too, for these modern signs are founded on sound principles.

This type of sign should be especially interesting to the smaller shops, since the new outdooradvertising technique depends wholly on hand fabrication. This time, the little fellow has it over the big operator.

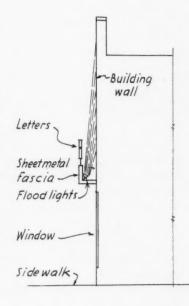
There is little scope for mass production, because standardized letters are not desired by the buyers.

"No two the same," in fact, might be a very good slogan for any shop soliciting such business—since the chief "talking point" is a distinctive design for every mercantile establishment.

The Hartman Sheet Metal Works, in Los Angeles, has been one of the most active shops in the letter forming game. They've been canvassing business houses in their trading area and doing quite a bit of advertising of their skill in this direction. As a result Hartman has been building up a steady volume of sign orders of late.

In an accompanying photo Ralph Shirley, one of the Hartman operatives, is getting ready to give their shop front a dose of their own medicine. (Incidentally, theirs is quite a smart little "front" for this little band of sheet metal crafts-

In general, these sheet metal letters are placed above and in front of a light trough. The flood lights in the trough throw the light up the building wall, thus silhouetting the letters. The "seeing" efficiency of this arrangement, say lighting experts, is several times greater than flood lighted letters.









Left—Exterior of Hartman Sheet Metal Works, Los Angeles—this firm has designed and installed scores of signs and finds this business profitable enough to warrant advertising. Right—Hartman operator Ralph Shirley holds up part of Hartman's own shop sign.

men?)

The sign that will soon adorn Hartman's shop is typical of the new trend. Of 24-gauge, the letters are three sided only, the back being left open for study or galvanized braces to be inset and soldered in place.

"It takes about an hour," says Mr. Hartman, to cut a letter and another hour to solder the joints or pieces. We're not trying for speed, but for a pleasing clean cut job with stoutly and neatly made joints."

The principle of the sheet metal sign's effectiveness is the high visibility of the bold silhouettes.

The massive block letters standing out in bold relief are probably the most legible of all signs on the market today. The heavy block letters also suggest solidity of the firm whose premises they advertise.

By mounting the letters 8 inches or more away from the store wall, the lettering is even more conspicuous.

Building walls in contrasting colors to the signs are of course recommended. Against stone, or light hued stucco, for instance, the sheet metal stands out in the boldest outline. It makes a sign that can scarcely be missed—even by today's faster auto-passenger traffic.

The base upon which the letters rest is a sheet metal trough, usually, which conceals the incandescent or gas filled globes in reflectors. These reflectors project the light on the *wall*, not the sign, just a few inches away. About 80 per cent less power may be used therefore and none of the light is wasted. Optical experts testify that the resulting silhouette after nightfall yields about the best visibility possible.

Occasionally the perimeters of the letters are picked out in Neon tubing which makes an attractive variation. A plain sign though, like Merlo's Market with its 8 ft. high metal lettering, can be identified at a distance of a mile or more.

Lengthier advertising messages can be produced in simple, flat aluminum cutouts, as in the case of the Auto Machine Shop illustrated. The hollow galvanized lettering of the shop's main sign is amplified by the smaller flat cutouts which are secured by metal studs to a backing painted in fire engine red.

The bigger corporations out west are specifying hollow metal signs in quantities. Those firms that maintain their own art departments generally furnish the sheet metal contractor with full size sketches as patterns. Small retailers who wish to use a letter sign usually leave the layout and design entirely up to the sheet metal artisan.

## Overtime Regardless of Union Contracts

The obligation to pay time and one-half after 40 hours, under the Fair Labor Standards Act, is not voided by the existence of a union contract calling for a workweek of more than 40 hours without the payment of overtime—except in certain instances—Colonel Philip B. Fleming, Administrator of the Wage and Hour Division, U. S. Department of Labor, warned on November 18.

"Such a clause will have no legal effect, although the rest of the contract may stand.

"The Wage and Hour Division will not give weight to such a clause in making an inspection to determine whether the law is being complied with by an employer. The standards fixed in the Act may not be lowered by any kind of agreement."

## EVERYTHING IN STEEL

Ryerson carries the largest and most complete steel stocks in America . . . carbon steels, alloys, stainless, etc., in every size, shape and form . . . a ready, reliable source of supply.

## CERTIFIED QUALITY

Ryerson Certified uniform high quality Steels meet exacting, narrow range specifications . . . an important advantage—especially with alloy steels where chemical content, heat-treating response and other characteristics must be known with certainty to assure best results in less time.

## IMMEDIATE SHIPMENT

Fast delivery is assured from ten conveniently located Ryerson plants . . . no order too small for prompt, personal attention or too large for immediate shipment.



Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Cleveland, Boston, Philadelphia, Jersey City.

RYERSON

## WE HAVE EVERYTHING

















## **NORCO PRODUCTS:**



Asbestos Paper and Cement Ash Pans Ash Pit Doors Blowers Boiler Repairs Boiler Cleaning Compounds Boiler Grates Bonnets Broiler Pans-All sizes Brushes Casing Collars Cast Furnaces Cement C-I-C Enamel Cleaner Circulators Chain Chimney Cleanouts Chimney Tops Clinker Tongs Cook Stoves Copper Furnace Coils Dampers Doughnut Stoves Draft Adjusters Draft Regulators Elbows Fans Filters Fireclay Fireplace Dampers Fireplace Equipment Fireplace Grates Fittings
Float Valves
Floor Registers Flue Brushes Flue Scrapers Flue Stoppers Forced Air Fittings Furnace Brushes

Furnaces — (Norco Cast Steel, or Air Condi-tioning Unit) Furnace Check Dampers Furnace Cleaners Furnace Cleaners
Furnace Pipe & Fittings
(Angles, Elbows, Galvanized Tees) Furnace Pokers Furnace Regulator Accessories Furnace Repairs Furnace Slicer Bars Furnace Tees Gas Burners Gas Cocks Gas Ranges Gas Range Repairs Grilles Heat Controls Hot Water Coils Hot Plates Hot Water Thermometers Humidifiers Industrial Gas Burners Kitchen Heaters Kreuter Pliers Laundry Stoves Mica Non-Con-Dux Asbestos Products Norco Furnaces (Cast, Steel & Air Conditioning Unit) Oil Circulators Oil Stoves Oil Stove Repairs Paints Porcelain Door Handles Furnace Vacuum Cleaners

Quadrants Registers & Register Faces Repairs for all Makes of Furnaces & Boilers Shovels Snips Soot Destroyers Springs and Clips Spring Handles Stove Boards Steel Furnaces Stove Cleaner Stove Knobs Stove Lid Lifters Stovepipe Collars Stovepipe Dampers Stovepipe Elbows (Corrugated and Adjustable) Stovepipe Stovepipe Tees Stove Pokers Stove Polish

Stovepipe Wire
Stove Pokers
Stove Polish
Stove Putty
Stove Repairs
Stove Shakers
Stove Urns
Tank Heaters
Tees
Tinners Red & Gray
Tinners Snips
Tin Fittings
Thermometers
Turpentine
Ventilators (Accurate)
Water Pan Fillers
Wire Drop Handles
Wicks
Wire





NORTHWESTERN STOVE REPAIR CO.

Manufacturers of Stove, Furnace and Boiler Repairs 662 WEST ROOSEVELT ROAD, CHICAGO, ILL.

















J. W. Follin, Producers' Council, forecasts 80 million dollars for heating in 1941.

## The National Warm Air Meeting



W. J. Cameron, Ford Motor Co., sees nothing on the horizon to supersede warm air heating—if we remain alert to our problems.

1940 seems destined (when final reports are in) to be one of the largest dollar volume years, if not the largest, ever experienced by the warm air heating industry.

This was the atmosphere in which the 27th annual convention of the National Warm Air Heating and Air Conditioning Association was held in Detroit December 10 and 11. Manufacturers interviewed confidently expected a volume above 525,000 furnaces of all types produced and sold, and all manufacturers confidently look to 1941 as an equally large, if not larger year than 1940.

President C. A. Olsen keynoted the year's activities by pointing out that our industry has advanced very rapidly during the past two years with increasing public acceptance of warm air heating and with the potential house building volume for 1941 looking very bright indeed. "The public," said Mr. Olsen, "wants to know all about our product and our method of heating. It is up to us to satisfy this demand and we must make known the facts established by our many years

of research. While rearmament has held the spotlight during 1940, rearmament housing and private house construction seem likely to be the largest factors in the increased production volume for 1941. The Association has taken steps to disseminate our research information through the publication of a 'yardstick' which we hope will serve to acquaint the public with what constitutes a 'good,' a 'mediocre,' a 'poor' warm air heating installation."

## W. J. Cameron's Philosophies

"Warm air heating is just as basic and is just as much a necessity as the bread we eat." "The luxury we enjoy today is the commonplace service of tomorrow." "Nothing good or useful is ever superseded." "America is often called a rich country, but we are rich only by comparison with poor countries and every intelligent individual will admit that much remains to be done before America can rightly claim to be a universally rich nation." "The easiest thing any government can do is to go to war, but it takes more courage to

Left to right—President Olsen pleads for more cooperation from members. Professor Konzo describes how the "Yardstick" can overcome some of our present poor practices. Managing Director George Boeddener and convention recording secretary Jane Heck tabulate orders for the "Yardstick." Frank Mehrings announces a new specification form and a cooperative publicity campaign with the Mineral Wool Association. John Norris outlines an association sponsored home study course for dealers.

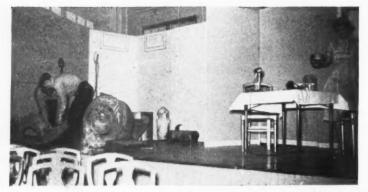












Mrs. Huffy Buys a Furnace (Williamson Heater skit) and (upper photo) gets her furnace scattered over the basement. Center, left—Joe Cleanum shows Mrs. Huffy the terrible cracks in her radiator. Center, right—And when Mr. Huffy comes home (two sheets in the wind) tch, tch, Mrs. Huffy has to sell him the idea that a twenty-year old furnace does wear out. Below — Mr. Huffy buys a furnace and phones the "boys" his trip to Chicago is all off because — "I just bought a damn furnace."





construct a busy economy than it does to go to war." "The 'big business' we hear so much about in America is, in the final analysis, a composite bigness made up of tens and hundreds of thousands of small businesses."

These philosophies were the highlights of the address by W. J. Cameron, Ford Motor Co., well known radio commentator. Mr. Cameron pointed out how in the beginning many industries enjoy natural advantages but these natural advantages often lead to lethargy and lethargy leads to new discoveries which nullify the original natural advantages. The speaker declared that he could see nothing in the immediate future which would supersede the warm air furnace, but he added the warning that everywhere men and organizations are striving to develop new products to supersede old products and no industry, no matter how well entrenched, can afford to let progress stagnate.

Mr. Cameron declared that America is a young giant and has no place in its philosophy for the isms and ideologies of the old countries. In America, of late, our manufacturers and men in commerce constitute the group which has shown the jitters. They fear this; they fear that; and since fear is always a measure of man's thinking, we cannot afford to fear because, said Mr. Cameron, we must believe in our way of life; we must believe that America offers the greatest opportunities; we must believe that the terrible struggle going on abroad is only a passing phase of civilization and so we should do everything possible to keep America strong and maintain our institutions.

## \$80 Million for Heating in 1941

J. W. Follin of the Producers Council, New York City, speaking of rearmament activities deCast of Characters

Mrs. Huffy—Lois
Weaver
Mr. Huffy—J. A.
Stermer
Joe Cleanum — Joseph
Grinkemeyer
Robby Fixit — Robert

Bobby Fixit — Robert Dwertman Mr. Sellem—L. A.

Knollman
Telephone Solicitor —
Jane Heck

Voice—S. W. Hetherington



clared that every business man today must be willing to take time out to help the preparedness program. As war is waged today, explained Mr. Follin, any defense program is a production program. Total appropriations exceeding \$19,000,000,000 have already been voted and because of this tremendous money investment defense is today the dominant factor in all American business. At least \$2,000,000,000 of the \$19,000,000,000 voted to date is for construction and of this at least \$250,000,000 will be spent for housing. Of this \$250,000,000 at least \$80,000,000 will be spent for heating.

Mr. Follin reported briefly on the various agencies which are handling this expenditure; and the various sums of money allotted to different purposes; his report being practically identical with Washington letters by Arnold Kruckman as published in the last three issues of American Artisan. Mr. Follin declared that private industry can, and should, do a very large share of the needed housing, but a great many people fear that private industry will not take hold as it

should. While the fixed-fee basis of awarding contracts seems to be working out quite satisfactorily, the Army shows some indications of reverting to the lump sum bid and many jobs are exceeding the original cost estimate. The speaker visualized some tendency toward lump purchasing by government agencies with most such lump purchases up to date in 1,000 unit orders.

Mr. Follin also pointed out that many of the rearmament construction projects have been delayed because of an inability of contractors to obtain a decision on important matters from Army and Navy officers on the job. But he said that this was being overcome as officers were told from Washington to make decisions themselves. In the speaker's opinion, this eventually will lead to the purchase of more and more equipment and materials on the job and manufacturers should not overlook the job officer as a possible source of purchase. One of the things Producers Council has obtained is the specification which conforms with industry practice and the speaker asked every manufacturer to do his part to emphasize the delays which will occur when customary practice is sidestepped.

As a final word of warning, Mr. Follin pointed out that while rearmament is a tremendous undertaking, there was only \$4,000,000,000 of private construction in 1940 (not equal to the construction volume of the 1920's) so it is very important for all industries to maintain their

regular business volume.

е

1

n

## The Yardstick Is Ready

The long awaited "Yardstick," the booklet to be given to home owners or builders to tell the builder or owner specifically what constitutes a good, mediocre or poor warm air installation, was announced off the press and distributed to members.

Professor Konzo, who prepared the text for the book, said that already a number of very valuable alterations had been suggested, particularly a rearrangement of illustrations and text to make the appearance of the "Yardstick" more favorable. In connection with the yardstick, Professor Konzo suggested that a committee be appointed to meet with a similar committee from the Boiler Institute to discuss and if possible to "soft pedal" some of the claims which the boiler industry is now making in published literature.

Professor Konzo pointed out that the yardstick was deemed essential because there were too many poor warm air heating installations. No one, said Professor Konzo, has been able to determine exactly why this condition exists but it

may be:

1. Because there are too many installers in the business.

2. Too many contractors may not know exactly what they are doing.

3. The industry seemingly is going through a stage of acceptance of standardization and the attempt to standardize is resulting in unsatisfactory engineering and installation.

4. The home owner is somewhat to blame because of his ignorance of what constitutes good, mediocre or poor warm air installation.

Licensing, said Professor Konzo, has been suggested as a means of raising standards, but licensing to be satisfactory must also educate. Newcomers in the industry are not always the





Views at the Bowery, where Sally Rand's show "packed 'em in." That the show held attention is evident from the interested expressions on the faces. In the center—the Hollywood hobby-horse race was won by - - - - most spectators couldn't tell because of the same obstructions which bothered the camera man.





Research Chairman Sedgwick outlines future research at the session presided over by Vice-President Percival (left). Right—"Air Information Please" goes on the air while "experts" (left to right) Lau, Nessell, Sedgwick, Konzo and master of ceremonies L. R. Taylor answer the questions.

worst offenders, since many old time contractors are still thinking in terms of gravity heating and seemingly cannot accept the standards under which forced warm air heating should be designed and installed. Manufacturers are being blamed by contractors and contractors are being blamed by manufacturers with the result that the industry is getting nowhere.

While the "Yardstick" was originally intended as a piece of literature for home owners the industry should also keep in mind, said Mr. Konzo, that two important factors in the purchase of warm air heating systems are the FHA and the Operative Builder. Both of these agencies should be acquainted with the "Yardstick" and should use the "Yardstick" as a measure of determining what kind of a system they are purchasing.

## National Publicity Campaign

Frank E. Mehrings, chairman of the Publicity and Merchandising committee, briefly summarized the "Yardstick" progress to date and called attention to the space for imprinting on the "Yardstick" cover. This space is restricted only to manufacturer members of the Association. Mr. Mehrings also announced that a publicity campaign would be operated during 1941 in cooperation with the Mineral Wool Association; each industry to contribute half the expense. He also announced that considerable work has been done on a consumer booklet designed to publicize the "Yardstick," but this booklet will not be produced until it can be properly financed. Also a contract and specification form is in the course of preparation and will be ready soon.

Managing Director George Boeddener announced that a special printing of the "Yardstick" with the names of members of the National Warm Air Association printed on the back cover will be available shortly for distribution to architects, builders, etc.

## FHA Views the Yardstick

Robert K. Thulman, of the Federal Housing Administration, Washington, discussed the Yardstick from the consumer's angle and declared that consumers may be defined as:

1. Those who employ an architect and get a house built exactly as they wish.

2. Those who buy a house already built by an operative builder and must choose the house offering the most features they want.

The "Yardstick," declared Mr. Thulman, is an excellent piece of literature for the man who builds his own house, but for the man who buys a house already built the "Yardstick" may be useless since such a house already has a heating system the builder bought and the home owner may not even know who was the installing furnace contractor.

Since by far the largest number of houses are purchased from operative builders, it may be questionable just how much the "Yardstick" will influence warm air heating design and installation in new house construction.

## FHA Wants Better Installations

FHA is intensely concerned with poorly designed, poorly installed and poorly equipped warm air heating systems. Early publicity obtained by the warm air heating industry as the next big American business brought into the industry a very large number of individuals willing to experiment and gamble with equipment and with small understanding of installation practices. As a result of this, declared Mr. Thulman, there is today an alarming variety in quality of furnaces produced and installations made. Buyers expect FHA to supervise their purchases and to see that houses are properly heated. While warm air is now in the lead in preference it is conceivable, declared Mr. Thulman, if the industry does not take definite steps to eliminate some of its unsatisfactory practices, warm air heating will lose its present leadership. FHA, pointed out Mr. Thulman, can set up its own standards, but FHA does not wish to do this—it prefers to have the industry handle its own problems just as other industries have handled their problems. FHA confidently expects the national warm air heating industry to rise to the emergency and eliminate those products and practices which are definitely detrimental.

The training of men in the design and installation of warm air heating systems was given a prominent place on the program. Professor L. G. Miller of Michigan State University announced that the Tenth Annual Warm Air Heat-

(Continued on page 190)

## BOOKKEEPING—

## a Plan of Accounts [Part 4]

By Joseph G. Dingle, C. P. A., Ottawa, Ill.

Having presented detailed discussions of the several accounts in the "Asset," "Liability" and "Capital" and "Income" sections of our Chart of Accounts, we are now ready to take up the discussion of the "Expense" section. These accounts taken as a whole, constitute what is generally referred to as the "Overhead accounts", meaning that they are not applicable to any particular department, but to the business as a whole.

We again suggest that you refer to the Chart of Accounts, and by connecting up the October, November and December articles, you will find this particular discussion more complete. Last month we presented the Income Accounts, together with Returns and Allowances and Cost of Goods Sold. At that point we established our Gross Profit. As you well know, your selling price is more or less fixed by your competitors, and the cost of goods sold is more or less fixed by the wholesaler from whom you (and your competitors) purchase your goods, also by your employees, who are generally paid the same wage scale that prevails in the shops of your competitors.

## How to Get and Hold Net Profits

Thus, your Gross Profit, being the difference between your selling price and your cost, is purely competitive. It should be very close to that of your competitors. Net profit—Gross Profit less Overhead—then must be realized out of your expense accounts. In other words, the spread between selling price and cost of the goods is fixed at such a figure that if you can do an average volume of business and keep your overhead expenses down to normal levels you may earn a normal net profit. On the other hand, if you increase your sales volume or operate with less than normal overhead, your net profit will be greater. If you can increase your sales volume and keep overhead expenses below normal, you can earn a really substantial net profit. A good expense classification will materially aid you in keeping overhead under control. We now take up the discussion of the separate expense accounts and will offer some suggestions for the use of some of these expenses.

141-ADVERTISING-This account is for the purpose of receiving all charges for advertising. Newspaper ads, samples and all kinds of advertising should be charged here. Incidentally, there should be some relation between the amount spent for advertising and the total sales. Too often, the small business man fails to advertise at all, believing that he is sufficiently well known in his home town to make it unnecessary to tell his customers and prospective customers about the goods and services he has to offer. Again, some business men have a habit of running advertisements even though they have nothing new to tell the prospective customers. It is our opinion that between these two illustrations lies the best course. Do just as much advertising as will produce results. Tell your customers of the new things you have for their comfort or convenience and when they come in to see your place of business, take care of their comforts while there and give them the best sales talk you can: first, of your ability to serve them, then show them the goods you have to sell. This is the best kind of advertising and will pay great dividends. One parting shot here-Make and Keep your Advertising Honest.

142-BAD DEBTS-There are business men who pride themselves that they do not have any bad debts. There are others who claim that unless you do have some losses from this source you are not properly serving your customers. Some credit men refuse to accept business from people whose credit is not 100% perfect and as a result they lose business. Many a small fellow with limited capital is perfectly honest and is a good business man. Taking a chance on such a fellow will often turn into a very profitable venture. That little fellow will appreciate your confidence and will, as his finances improve, feel that you have first call upon his business in your line. We do not, of course, advocate the extending of credit to all kinds of people. Use good judgment in the letting of credit and you will lose some accounts, but you will, we believe, profit in the end. We believe it good business to let a customer realize that in extending him credit, you are actually lending him

## CHART OF ACCOUNTS

## **ASSETS**

- I-Cash in Office
- 2-Bank (Name)
- 3-Accounts Receivable
- 4-Notes Receivable
- 5-Investments
- 6-Inventory-Materials
- 7—Inventory—Appliances
- 8—Inventory—Supplies
- 9—Consigned Merchandise
- 10-Work in Process
- 21-Building
- 22-Machinery & Equipment
- 23-Delivery Equipment
- 24—Furniture & Fixtures
- 31-Proprietor's Drawing Account (Or Partners' Drawing Accounts)
- 41—Deposits—Franchise
- 42-Prepaid Insurance

## **EXPENSES**

- 141—Advertising
- 142-Bad Debts
- 143—Collection Expense
- 144—Discount Allowed
- 145—Delivery Expense 146—Depreciation
- 147—Dues & Subscriptions
- 148-Freight & Drayage
- 149-Heat, Light & Water
- 150-Interest Paid
- 151—Insurance—Fire
- 152—Insurance—Liability 153—Insurance—Workmen's Comp.
- 154-Indirect Labor
- 155-Machine & Tool Expense
- 156—Office Expense
- 157-Rent
- 158—Repairs—Delivery Equipment 159—Repairs—Shop
- 160—Salaries—Office
- 161-Salaries-Selling
- 162—Selling Expense
- 163—Supplies Used 164—Taxes—Real Estate & Personal 165—Taxes—Income
- 166—Taxes—Old Age Benefits
- 167—Taxes—Unemployment Comp.
- 168—Telephone & Telegraph
- 169—Travelling Expense

money, and that you must know when he will pay you so you can plan your business financing accordingly. It is not good policy to act as if you had all the money you need and let customers walk out with your property without some agreement as to when they are to pay you. Bad Debts are not a thing to be ashamed of. They are the necessary expenses of any well conducted business and like some of the other expenses, can be controlled to some extent by careful attention to the matter of credit.

143—COLLECTION EXPENSE—After an ac-

## LIABILITIES

- 51—Accounts Payable
- 52-Notes Payable
- 53-Notes Receivable Discounted
- 54—Consignment
- 61-Accrued Wages
- 62—Accrued Taxes—Real Estate & Personal
- 63—Accrued Taxes—Old Age Benefits
- 64-Accrued Taxes-Unemploy. Comp. Federal
- 65-Accrued Taxes-Unemploy. Comp. State
- 66-Accrued Interest
- 67-Accrued Workmen's Comp. Insurance
- 71-Reserve for Depreciation-Building
- 72-Reserve for Depreciation-Mchy. & Equip.
- 73-Reserve for Depreciation-Del. Equip.
- 74—Reserve for Depreciation—Furn &

## CAPITAL ACCOUNT (Or Accounts)

- 81-One account, if individually owned;
  - Separate accounts for each partner if
  - a partnership;
  - Capital Stock and Surplus, if Corporation

## INCOME ACCOUNTS

- 101-Sales of Material
- 102-Sales of Labor
- 103—Sales of Appliances
- 104—Sales of Appliances, Wholesale
- III-Returns & Allowances-Material
- 112-Returns & Allowances-Labor 113—Returns & Allowances—Appliances
- 114—Returns & Allowances—Appliances, Wholesale
- 121-Cost of Sales-Material
- 122—Cost of Sales—Labor
- 123—Cost of Sales—Appliances
- 124—Cost of Sales—Appliances, Wholesale
- 131—Discount Taken
- 132—Interest Earned
- 133—Commissions Earned

count gets a little old, it is often times good policy to use some sort of collection service to convert the account into cash. This is particularly true of accounts which appear to be "riding" you. Rather than merge this with some other expense, we have provided a specific account for the purpose.

144—DISCOUNT ALLOWED—While we have included this account in the ordinary operating expenses, it is similar in character to account No. 131—Discount Taken, except that it is to contain the discounts you have allowed your customers for the prompt payment of their accounts.

145—DELIVERY EXPENSE—This account, as its name implies, is to contain the cost of delivery, except such items as are covered by other specific accounts. We have a specific expense account entitled "Repairs—Delivery Equipment" and if desired, there may be used an expense account for "Gasoline & Oil." As to the salary of the truck driver, that may be included in account No. 154 "Indirect Labor" or, if desired, placed in a specific account for the purpose.

146—DEPRECIATION—This expense account is to contain all depreciation charged. Refer to our remarks on the several Reserves for Depreciation for the monthly treatment of this item of expense. Having in the reserve accounts the details of the several kinds of assets subject to depreciation, we can safely merge the expense into this one account.

147—DUES & SUBSCRIPTIONS—A good business man belongs to his trade association and as such a member will pay dues. He will subscribe to the trade journals of his craft. The cost of these dues and subscriptions will be charged to this account as will also the dues to the Chamber of Commerce, the Business Men's Association and other similar organizations devoted to the cause of good business and civic affairs.

148 — FREIGHT & DRAYAGE — Inbound freight, express and drayage on materials and appliances should be charged as a part of the cost of the materials and appliances, but some business men prefer to treat them as an item of overhead. We are here providing this account for the purpose of containing such freight, drayage and express as may be paid on outgoing shipments not chargeable to a customer, and suggest that inbound freight, express, and drayage be charged to the inventory accounts affected.

149—HEAT, LIGHT & WATER—These three services pertain to the use and occupancy of your shop and may be included in a single account without loss of value in the information concerned.

150—INTEREST PAID—This account is included among the expenses for convenience, but should be shown as "other expense" in the operating statement. Interest on borrowed money is not so much of an operating expense, but a capital expense, being necessary usually because of the limited funds of the proprietor. In our discussion of account No. 66, "Accrued Interest" we have discussed the method by which interest expense will be taken into account monthly, as it accrues, rather than when paid.

151—INSURANCE—FIRE—This account, as its name implies, is to contain the expense incur-

red for fire insurance. In our discussion of account No. 42, "Prepaid Insurance," we have outlined the manner of operation of this item, to enable the business to take each month the proper expense for this service.

152—INSURANCE—LIABILITY — Liability insurance, like fire insurance, is paid for in a single item, yet covers a year or more. The same treatment as suggested for Fire Insurance, under Prepaid Insurance, would apply here, thus bringing into this account each month its proper share of the expense.

153 — INSURANCE — WORKMEN'S COM-PENSATION—In our discussion of Account No. 67, Accrued Workmen's Compensation Insurance, we covered the monthly procedure in this matter. This account is to contain the monthly charge for this particular expense.

154—INDIRECT LABOR—This account, as its name implies, is to include all expense for labor not applicable to the cost of sales of labor. To illustrate, if you have a truck driver, who does not perform any work chargeable to the work sold as labor, his entire wages would be charged here. You may have occasion to use some of your men on work not properly chargeable to any other account, and such costs would be included here.

155—MACHINE & TOOL EXPENSE—Small tools have a way of "walking off" and are constantly being replaced. Occasionally there is some expense which may not be properly charged to repairs—shop, yet has to do with the maintenance of the machinery and equipment, and such items may be charged here as machine expense. Care should be exercised that no machine or equipment purchases, other than small tool replacements, are charged to this expense account. Machines and equipment as capital items should be charged to the asset account No. 22—Machinery & Equipment.

156—OFFICE EXPENSE—This account will contain all office expense, such as bookkeeping supplies, stationery, postage, etc., but not salary of the bookkeeper, which is to be charged to the specific account provided therefor.

157—RENT—This account name is quite indicative of its purpose. If, however, the premises occupied by the business are owned instead of rented, this account would not be necessary. Instead, there would be such accounts as properly analyze the expense incidental to ownership. In the Chart of Accounts, we have included "Building" and "Reserve for Depreciation-Building" and there discussed the problem of depreciation of building. Interest on a mortgage on the build-

(Continued on page 204)

## Managing a 1,000 Furnace a Year Volume

(Continued from page 126)

	AIR	CONDITIONING INST	ALLATION PROGRESS		
CREW	WORK	BUILDER	JOB ADDRESS	AC#	COMMENTS
Jones	Wall	Westuplats	13 45 Kenyon	2975	#18 ill 2975 W
Smith	Basement	J. X. Smith	3rd + Maple	3075	# 2 Rough 3075B
Have Wacker Barnes Ruhmond	Baument	Milakleson	1337 Oliver	2984	Bill 2 975 B
Jordham Spitaloky	Walf Basement	James	" & N. Aakland	2732	Bill 2732 W Jinish 2732 B
Moll Fling 5 tarker	Recreation Rm	Jacobson	1475 Palmer	2914	Bill2914B
5 tarker West	Basement	Jacobson	1477 Palmer	2913	Rough 2913 B
Harmison Sangson Perkins Ward Dulton	Wall Basement	Meadows	M. arlington	233/ 31 33 34 35	
Bennett	Sarage	Stanley	1375 15%	2954	#, See Sofunger
Youll	W+B	Meadows	N. arling too		# 2 Report to Harmison on Tot

Fig. 3—Master Assignment Sheet maintained by the Manager is made out at the end of each day and shows the crews and job to be worked on next day. If a crew has more than one job the manager assigns priority. Crew leaders, supervisors, truckers, must all make reports to the manager in order that the manager may fill in this next day's sheet.

ment. Certain changes such as relocation of risers must be made on nearly all jobs and limited authority is given to the Supervisor to make them in order not to delay operations. All Supervisors are instructed in the elements of design and keep in mind dangers of extra-resistance due to turns, extra lengths of ducts, etc.

No effort is made to differentiate between "stack crews" and "basement crews" other than the natural one of individual ability. It is felt that a crew that can handle both types of work is of more value than one that can be used only on a particular phase of the work, so every opportunity is given the men to increase their skill by a variety of assignments. All installation men are paid on an hourly basis, the scale varying in accordance with skill and service. From 45 cents per hour for inexperienced helpers to 55 cents and up per hour for mechanics is average.

## "Keeping Track" of Crews

After completion of the stacking, the plan "as it went in" is turned in to the Engineering Department with a request for a final drawing. This print is used by the basement crew who install all basement duct work. Notice is sent by the Supervisor to the Unit and Burner Installation Department when the basement has been poured and the job is ready for the unit. One or more trips to the job are frequently necessary at this point if the layout is complicated, in order to make sure the crew understands what it is doing. When all work has been completed, including the placing of registers, the Supervisor makes an in-

spection and reports to the manager, "Bill for Completion." This final step takes the job out of the Installation Department and all records are removed from the active files.

It has been found that the placing of registers on a job is work of such a nature that "specialists" are the most efficient. These "register crews" (in most cases, two crews of two men each) put in all registers upon assignment by the manager. Notice of readiness for registers is usually phoned in by the builder, although a supervisor will frequently turn in requests. Registers are taken out of stock immediately and loaded on the small company-owned trucks used in all their work. It is frequently necessary to send these crews on such work as installing asbestos connections, garage lines and insulation, recreation room lines, plenums, etc. They can carry their own material with them and handle those troublesome, fifteen minutes to four hour

The assignment of crews to the various jobs is one of the most important phases of management. A manager must know at all times of the day where each of his crews may be found. Rush work may arise making it necessary to move a crew from a previously assigned job. Furthermore a builder may wish to know if his job is to get attention that day. So that this information may be available to anyone interested, a Master Assignment Sheet is kept on the manager's desk. On this sheet (see Fig. 3) the names of the crews, job numbers, addresses, etc., are kept. If a crew

(Continued on page 214)

PROFITS HERE FOR YOU. with GALVANIZED

With production on the upswing, prompt expansion of existing industrial facilities has become essential. Often, particularly in smaller plants, stepped-up schedules have prevented regular maintenance crews from handling this work. And right there is an excellent opportunity for you to get on the inside track and pick up extra dollars.

Roofing and siding for extensions and new buildings, ventilating ducts, flues and intakes—these

are but a few of the current sheet-metal needs of expanding industry, needs which cannot be put off.

When you figure these industrial jobs, remember to specify Beth-Cu-Loy Copper-Bearing Galvanized Steel Sheets for extra corrosion resistance. Beth-Cu-Loy Sheets give longer service than standard Bethlehem Galvanized Steel Sheets, yet they're just as uniform and just as easy to work, and they cost only a few cents more per sheet.

## BETHLEHEM STEEL COMPANY



975 W (3075B

75 B

31 W

B

913 B

## AN OPEN LETTER to the heating trade...

FRONT PANK

1940 took us by storm...it is the biggest year on FRONT RANK FURNACES in the history of Liberty Foundry. Even with the plant working at capacity, and despite our huge production facilities, we have been hard-pressed to keep abreast of the flood of orders which have poured in.

But...for 1941...we have great plans afoot. Even our name is undergoing a change...it is now Front Rank Furnace Co. Increased facilities are a part of the new order. More equipment is arriving daily...additional personnel is being put on. We're getting ready to make the coming year the greatest yet for Front Rank Heating Equipment. So...get on the band wagon. There's still time for you to join our rapidly growing dealer organization and get your share of the 1941 profits. Write for complete information on the new Front Rank Furnace Company's Dealer Plan.





Left—Headquarters and Office • Above—Foundry



## A COMPLETE FRONT RANK WARM AIR HEATING UNITS

- ☆ WINTER AIR-CONDITIONING FURNACE

  ☆ CAST IRON FURNACE
- ☆ STEEL FURNACE ☆ STOKERS

Also a complete line of Registers, Winter Air Conditioning Furnaces, Blowers & Oil Burners



## The Reference Book of an Industry

Essential Data Assembled in one Volume - Concise - Compact - Convenient

## CATALOG DATA SECTION

Apparatus and materials produced by manufacturers in the heating, ventilating and air conditioning field are illustrated and described.

This equipment data, used in conjunction with the information contained in the Technical Data Section, gives to GUIDE readers a coverage of the entire subject—design, production, installation and maintenance.

Modern equipment, developed by men versed in the technical phases of design and production, is arranged in 5 sub-divisions for convenient reference.



## TECHNICAL DATA SECTION

In 46 chapters of carefully edited engineering data and general information, all phases of heating, ventilating and air conditioning, and related problems in refrigeration, are treated comprehensively.

In 808 pages, are detailed presentation of fundamentals, amplified by exhaustive research in laboratory and field. The experiences of men actively engaged in the profession and the industry are applied to the practical everyday problems encountered in design, production, installation and maintenance.

Data contained in both sections of THE GUIDE are indexed in detail—technical data alphabetically in subject arrangement—equipment data in classified groups. Many cross references coordinate the data in the two sections of the book.

Judge for Yourself — on a Ten-Day Satisfaction-or-Money-Refunded Plan

## The Guide Publication Committee

S. S. SANFORD, Chairman

C. M. HUMPHREYS

A. J. OFFNER

P. D CLOSE

M. F. RATHER

ORDER NOW ->

AMERICAN	SOCIETY	OF HEATING	AND VENTILATING	<b>ENGINEERS</b>
51 Madison	Avenue, 1	New York, N.	YDept. K	

Enclosed is \{\\$5.50 for thumb-index-issue}\ of Heating, Ventilating, Air Conditioning Guide 1941; please send me a copy. It is understood that I may return it within 10 days, if it is not satisfactory, and you will refund my money.

Name Position

REMITTANCE WITH ORDER □ MONEY ORDER □ CHECK

## BECK... the name that means

ENGINEERING PERFECTION and a complete line of HEAVY DUTY FURNACES and AIR CONDITIONERS

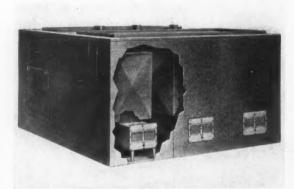


Illustration above shows the Beck Thermogas Heavy Duty Gas Fired Furnace and Air Conditioner which is available in all sizes, for small residences to the largest public buildings. This unit with its advanced design, efficiency and safety will enable heating contractors to complete every heating job with a minimum of time and effort and with the assurance of top performance for many years. The Thermogas unit is equipped with complete automatic controls consisting of gas pressure regulator, gas motor valve, safety pilots, temperature limit control, temperature blower control and automatic humidifier. When desired other blowers, controls, dehumidifiers, etc., may be substituted for or added to the standard equipment.



This is the Beck Thermogas Gas Fired Unit Heater for floor and wall mounting—available in every size for every requirement from residence to largest public buildings. Incorporates all features of Beck design and engineering. Built of the finest materials and guaranteed to produce its AGA ratings. Unusually large combustion chamber and large heating surface providing maximum heat from lowest gas consumption. Get the facts on Beck Thermogas equipment today—another unit in the Beck complete line.

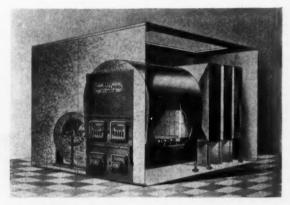




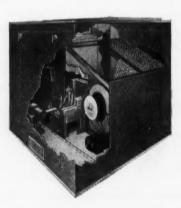
Write today for full details of the Beck Big Profit Plan for agents and dealers. 1941 will be a big year for all handling the Beck complete line.

BECK ENGINEERING

3033 SPRUCE STREET



This is the Thermalfuel Heavy Duty Coal Fired Furnace and Air Conditioner—made also for stoker, gas and oil—low ratio of heating surface to grate area (never more than 30). Radiators can be doubled in number and still have ratio lower than usual. Height and width and length of combustion chamber increased at same time, thereby preventing overheating of front section in larger unit assemblies. Thermalfuel Heavy Duty Furnaces and Air Conditioners meet every demand with Beck engineered perfection in every detail. Learn today how you can profit from a tie-up with Beck.



The Thermoil Model O Unit shown with oil burner housing—the perfect answer to oil heating problems in installations from the smallest to the largest. Not "just another oil burner or air conditioner" but a scientifically designed and engineered unit, built to get the utmost out of every drop of fuel—built to give long term satisfaction at lowest first and operating cost.

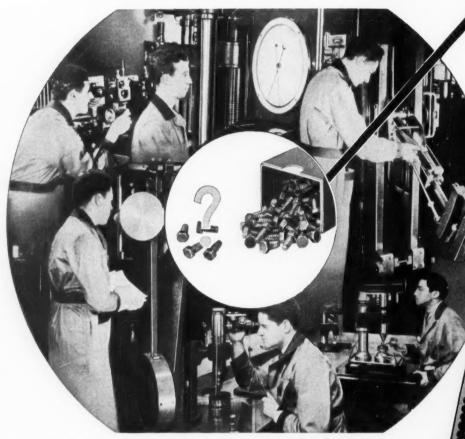
COMBUSTION KOMPANY

ST. LOUIS, MISSOURI

TRADE MARKS . . . Backed



WE'LL KEEP THE "Doubtful Few" OFF
YOUR ASSEMBLY BILLS



Parker-Kalon's Unequalled Quality-Control Laboratory eliminates the extra costs built up by "doubtful" screws

Fastening devices cost little... when they work right. When they don't, they cost plenty! The "Doubtful Few" . . . the imperfect units in a lot that won't drive properly, or fail in service . . . carry with them a high bill for extra time and labor, interrupted work and customer dissatisfaction.

To protect you against the costboosting "Doubtful Few", the Parker-Kalon Quality-Control Laboratory was established. Without counterpart in the industry, it makes it possible to hold Parker-Kalon Hardened Self-tapping Screws, Socket Screws and other fastening devices to higher standards than ever before could be attained!

Specify Parker-Kalon for fastening devices that Always Work Right and Hold Tight. Send for folder and free samples. Parker-Kalon Corp., 190-192 Varick Street, New York.

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

Quality- PARKER-KALON Controlled Fastening Devices



## Certified Quality Code for Gas Heating

(Continued from page 91)

more than five (5) feet from the floor in a living room,

hall or similar space.

Thermostat location shall be selected in a manner which will avoid adverse effect on its normal operation caused by the following proximities: hot or cold pipes, ducts or flues, kitchen doors, fireplaces, warm air registers, outside windows and doors.

Summer Switch.-A summer switch shall be provided which makes it possible to operate the blower independently of all other controls. This switch should be located at some convenient point (first floor preferred). stalled near a light switch, it should be of the key type or different in operation from the light switch.

Humidity Control. - Humidifiers having evaporation rates sufficient to cause condensation must be equipped

with a humidity control.

The method of operation of the controls must conform to the manufacturer's recommendation for his particular make of equipment.

### Electrical Wiring:

All electrical work shall be done in accordance with the requirements of local ordinances, codes and rules and regulations of the National Board of Fire Underwriters.

The 110-volt line supply to the unit shall be separate circuit and a separately fused switch provided.

All 110-volt wiring shall be in BX or conduit.

All low voltages wires shall not be less than No. 18 cotton covered and paraffin-insulated or rubber covered

Transformers should be mounted as close as possible to the unit so that long runs of low voltage wiring may be eliminated.

All low voltage wiring shall be made with a standard color coded wire to insure that wiring will be correct and to aid in tracing any low voltage circuit.

#### Gas and Water Piping:

All gas piping shall be made in accordance with The Peoples Gas Light and Coke Company's "House Piping and Appliance Installation Rules." Information pertaining to street service, meters and fuel run sizes is shown in Appendix B\*

A shut-off valve and strainer shall be installed in the humidifier supply line.

Air Distribution System:

The conditioned air shall be delivered to the various spaces to be heated and returned to the unit through a complete system of sheet metal ducts, the construction of which shall conform to the following requirements:

### A.—Design Limitations:

1. In no instance shall it be permissible to return air from the first floor to the basement or unexcavated space through open registers or to return air from any basement section not used as living quarters.

2. If a two-speed fan is incorporated as a part of the unit, an extended plenum chamber type of duct de-

sign shall be used.

- 3. In cases where two or more independent apartments or dwelling units exist in one building, each apartment or dwelling unit shall have its own heating unit with its own individual, independent warm air supply duct system, return-air duct system and thermostat.
- 4. Whenever a house requires a unit with a Btu. input capacity greater than 240,000 Btu. input per hour, the layout and specifications should call for two or more individual units, each heating a portion of the house



# "I MAKE MONEY ON EVERY JOB

... no 'doubtful screws' to push up my costs"



### "You can't beat genuine Parker-Kalon Screws for better fastenings every time!"

Of course, you are no different from other good sheet metal workers. You want to steer clear of anything that threatens your profit or quality of work. That is why it will pay you to demand only genuine Parker-Kalon Sheet Metal Screws ... for then you will be sure to avoid "doubtful screws"-screws that look all right but of which a percentage fail to work satisfactorily and run

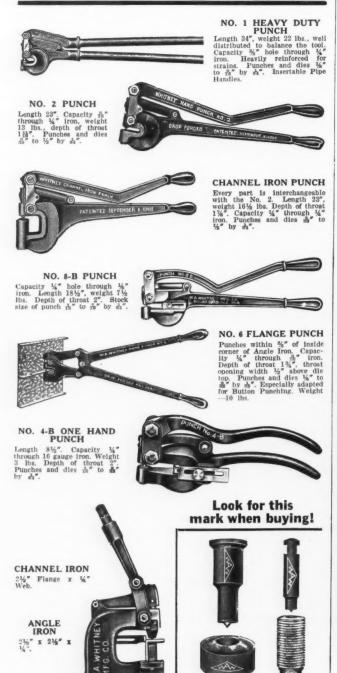
Every Parker-Kalon Screw you use is backed by more than 25 years of sheet metal screw-making experience, and Quality-controlled through every step of manufacture by the famous Parker-Kalon Laboratory. So to be certain of getting better fastenings and the profit you figured on, insist on genuine Parker-Kalon Screws.

Parker-Kalon Corporation 190-192 Varick St., New York, N. Y.



<sup>\*</sup>Appendix B refers to general instructions on gas piping and service information.

# \* \* \* \* \* Jools by WHITNEY



EXTRA PUNCHES AND DIES

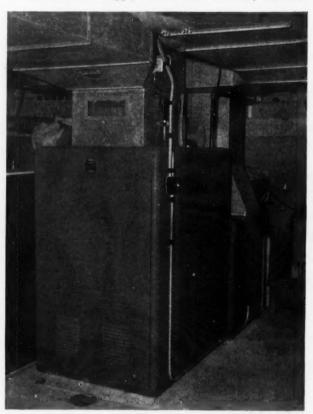
Prompt shipments can be made of any size or any quantity of both types of extra punches and dies as

WRITE FOR

CATALOG

and each with its individual, independent warm air supply duct system, return air duct system and thermostat.

- Garages shall not be heated from the same heating plant used to heat the living quarters.
- 6. The duct system shall be designed so that the warm air supply ducts will be adequate to deliver at least 15 cu. ft. of air per minute for each 1000 Btu. heat loss per hour.
- No individual supply duct for residence heating shall be designed to handle more than 150 C.F.M.
- No individual return duct for residence heating shall be designed to handle more than 200 C.F.M.
- 9. When return air ducts are to be installed under the floor of a basementless house, they shall be made of vitreous tile spaces formed in concrete floor slabs, or some similar structural material, and be pitched to a point directly under the unit and provision made for a drain.
- 10. In long, narrow rooms exposed on two long sides and one narrow side, the warm air register or registers should be installed on the outside narrow wall.
- 11. Any room supplied by a duct having an equivalent length of 70 feet or over should be supplied by an individual duct direct from the plenum chamber of the unit to the register opening or openings in the room.
- 12. Recreation rooms in basements shall be supplied with an individual supply and return duct and, wherever



C Q furnace and installation in two-story house. Duct construction and details of wiring, piping, etc., all conform to code.

possible, the warm air outlet should not be more than 12 inches above the floor.

- 13. A separate trunk duct shall be run in rooms over garages and the heat loss figured by considering the floor of such rooms as outside exposures.
- Risers shall not be run in exterior masonry walls unless insulated on three sides with one-half inch Balsam wool or its equal.
- 15. Each room in which heat is desired shall be provided with at least one supply register.

NO. 91 BENCH PUNCH

Capacity 1/2" hole through 1/4" iron, hole through 1/4" iron, 2" hole through iron. Weight 82 lbs. Depth of throat Stock size of nunches and dies 1/4" to

- 16. A branch duct shall not be taken off the inside radius of a curve in the trunk or at a point immediately following the curve.
- 17. No trunk, basement branch or riser stack on residence installations shall have a ratio of width to a depth of more than 4 to 1.
- 18. Registers shall be of the diffuser type specifically designed for air conditioning systems, shall be at least the full width of the riser, and shall have a free area of not less than 75% of the total face area.
- Warm air registers should be located on inside walls wherever possible.
- 20. No register or grills shall be installed in the floor
- All registers shall have provision for closing which is readily accessible from the room in which the register is located.
- 22. All return air openings in bedrooms, kitchens and recreation rooms shall be provided with registers having shut-off dampers operated from the face.
- 23. When high side wall registers are used, they should be designed for a register velocity of 500 to 600 feet per minute, except in small bathrooms and toilets. When the distance from the register to the opposite side of the room is over 15 feet, higher velocities should be used.
- 24. High side wall registers shall be located so that the top of the register is at least 12 inches below the ceiling.
- 25. High side wall registers shall not be located so that they are opposite any kitchen exhaust fan.

### B.—Construction Requirements:

- All ducts, branches, risers and stacks shall be constructed with full free area maintained without abrupt angles or obstructions.
- All risers shall be made of material not lighter than 28 gauge galvanized iron or equivalent, constructed

- with double locked seams and connected at joints with standard "S" and drive cleats, or equivalent method
- Plenum chamber and trunk lines shall be constructed of prize galvanized iron according to the following table:

Width of Duct Inches	Minimum Gauge	Sea	am	Reinforced Seam
Up to 12 in.	28	1	in.	
13 to 18	26	1	in.	
19 to 30	24	1	in.	1/8 in. x 1 in.
31 to 60	22	1 1/2	in.	1/8 in. x 1 % in.
61 to 90	20	114	in	16 in v 186 in

- All branches taken off the main trunk shall be made by transition fittings having a depth equal to the depth of the trunk duct and have the same crosssectional area throughout.
- Connections between branches and risers shall be made with approved transition boots or fittings with equal cross-sectional area throughout.
- A branch duct shall not be taken off the inside radius of a curve in the trunk or at a point immediately following the curve.
- All elbows should be of the double radius type and constructed with a center line radius of not less than 75% of the width of the duct.
- 8. Vanes shall be installed in all partial turns of trunk multiple lines and in all elbows where the width of the turn is 12 inches or more. A minimum of 4 inches should be allowed between vanes.
- 9. All supply and return risers and branch trunk ducts run in outside walls, unexcavated spaces, unheated attics, garages, and the like, shall be insulated with not less than ½ inch Balsam wool, or equivalent, which shall be securely fastened in an approved manner.

# **HEC** DAMPER REGULATOR SETS



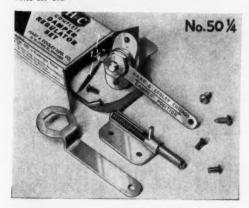
ECONOMY TYPE—Quality at a Price!
Furnished with both wing and hexagonal lock nuts.
Made only with '4" Bearings. No. 401/4 S—List

(No. 40¼ S Set with snap bearing is now furnished for No. 40¼ Set at 30c List Price)

# Pick the Type that Suits you Best!

H&C offers three different sets in the 1/4" size, all furnished with snap end bearing to permit the installation of even the smallest dampers without bending. All are quality sets in every detail with all parts rust-proofed; all are equally adaptable to splitter or requiar dampers. See your Jobber or write for sample and descriptive literature.

# HART & COOLEY MANUFACTURING CO. HOLLAND, MICHIGAN - - Chicago Office at 61 W. Kinzie Street



BRACKET TYPE (left)

With 1/4" Bearings. No. 501/4—List Price 40c Set. With 3/4" Bearings. No. 503/6—List Price 60c Set. 3/4" size has snap end bearing.

DISK TYPE (right)

With 1/4" Bearings. No. 801/4—List Price 40e Set. With 3/4" Bearings. No. 803/4—List Price 60e Set. 1/4" size has



- 10. Ducts passing through masonry walls shall have a clearance of at least 1 inch from all parts of the
- 11. Return air ducts should be constructed so that there are no traps.
- 12. Volume dampers with positive locking devices shall be installed in each supply and return branch duct. Such dampers shall be accessible, operate freely, and be provided with an indicator to show its position in the duct. Stack-head dampers will be considered as the equivalent of a volume damper.
- 13. If splitter dampers are used, the length of these dampers shall be at least twice the width of the branch duct.
- 14. If an outside cold air intake is used, a damper which is tight fitting, adjustable and accessible shall be installed therein. The opening of this intake shall be provided with a fine mesh screen to prevent foreign matter, insects, etc., from being drawn into the duct system.
- 15. Full support of all risers and fittings and basement duct work shall be made to studding or joists with heavy galvanized band iron, or equivalent.
- 16. Main trunk lines 30 inches or over in width shall be supported every 4 feet with not less than 1/2 inch standing seams.
- 17. Register faces shall be assembled against gaskets to prevent streaking.
- 18. Registers installed in walls shall be supplied with frames securely fastened to studding and tightly assembled to the stack-head to preclude air leakage.
- 19. Return air grilles shall be installed so that the bottom of the register is not more than 1 inch above the
- 20. All supply and return ducts shall be provided with a label located for convenient observation (preferably at the damper). This label shall designate the space supplied, Btu. heat loss, C.F.M. supplied, register

temperature, and the proper position of the damper when the system is balanced.

### Installation of Heating Unit

1. The heating unit shall be located in a room with sufficient air supply for ventilation and combustion.

Adequate ventilation will be interpreted as being reasonably complied with when the room in which the unit is located has at least one door and windows (of average construction) which will provide for at least 50 lineal feet of crack for air leakage for each 100,000 Btu, input rating of the appliances installed.

If the appliance is installed in a room which has no means for outside ventilation, such a room shall have permanent openings to adjacent rooms which have means for outside ventilation in accordance with the above. These openings shall have at least 50 sq. in. of free area per 100,000 Btu. input rating of the appliances installed.

When it is necessary to provide for openings from the furnace room to the outside to obtain proper air supply for ventilation and combustion, air openings to unexcavated ventilated space under the building or directly to the outside (from two walls) shall be provided. Such openings shall be constructed with metal sleeves, be properly screened and have a net free area of 25 sq. in. per 100,000 Btu. input rating and have a minimum area of 75 sq. in.

- 2. Ample clearance shall be provided around the unit to allow for ready access for cleaning of all heating surfaces and for ready removal of filters, burner parts, fan motor and controls.
- 3. The unit should be located as near to the chimney and as centralized with the heat distribution system as possible.
- 4. The unit shall be erected in accordance with the manufacturer's instructions.
- 5. The unit shall not be installed so that its location

# There's

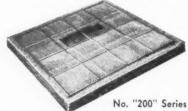
# RESEARCH AIR FILTER

### RESEARCH FILTER WITH CARDBOARD FRAME



Disposable filter, which when dirty, is replaced by entire new unit. For warm air furnaces, air conditioning units, filter banks.

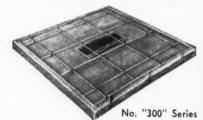
### RESEARCH RE-FIL-ABLE FILTER WITH HOOKED WIRE GRIDS



Filter pad, sandwiched between 2 wire grids which hook together, is easily replaced. Used in furnaces, air conditioning units and filter banks.

# for every forced air and air conditioning need

RESEARCH RE-FIL-ABLE FILTER WITH HINGED WIRE GRIDS



Easiest to change of all Re-Fil-Able filters. Replaceable pad held snugly between hinged wire grids. Used extensively in filter banks.

RESEARCH STEEL FRAME RE-FIL-ABLE FILTERS



Re-Fil-Able filter with permanent frame, complete with wire grids to hold the removable pad in rigid position. New pad easily inserted.



Write for descriptive price sheets—also for new technical data bulletin on filter banks.

# RESEARCH PRODUCTS CORPORATION

Madison, Wisconsin

interferes with the serviceability of other appliances in the room.

The unit shall be set level, be made firm and even, and shall be insulated as to sound from its support.

#### Flue Connections

The drafthood shall be connected directly to the furnace outlet in accordance with the manufacturer's design and as approved by the American Gas Association.

s

h l. s ll

h

e

st

g

m ir

S

g

h

g it

he

as

d

- A furnace flue made of not less than twenty-six (26) gauge Armco, Toncan, Lyonore or equal corrosion resisting material shall connect the furnace to a suitable chimney. This connection shall be as short and direct as possible.
- 2. Flue pipe and chimney liner sizes, normally required to handle various amounts of gas to be burned in gas designed central heating plant equipment, are shown in the following table. These sizes shall be considered as adequate for taking care of the products of combustion when the horizontal run of flue pipe does not exceed 12 feet and excepting on equipment which has down draft flue passages. The size of the flue pipe on all types of down draft equipment shall be at least equal to the size of the opening of the outlet on the furnace.

Gas Btu's		ut in Hour										]				er of Flue Be Used
60,000	to	120,000			0				 						.5	inch
120,000	to	180,000				0			 				0		.6	inch
180,000	to	250,000					 		 		۰		0		.7	inch
250,000	to	350,000							 						.8	inch

- 3. The flue pipe shall be properly insulated when installed near combustible materials. The insulation shall be of sufficient thickness and evenly applied.

  4. Flue pipe shall in all cases have an unward pitch
- 4. Flue pipe shall in all cases have an upward pitch from the draft diverter to the chimney opening.
- 5. When equipment to be vented has more than 1 flue connection and it is necessary to build a manifold to collect the flue products, the connection between the flue pipe connecting the manifold to the chimney shall be connected at the center of the manifold and not at the end.
- 6. An approved thimble of 20-gauge galvanized iron, terra cotta or, equivalent, properly fitted and extending to the chimney lining shall be provided where the flue pipe enters a masonry chimney.
- Flue pipe shall not project into flue space of chimney or telescope into furnace drafthood or fittings.
- Flue pipe shall be adequately supported with straps or hangers whenever of such length as to be otherwise unstable or insecure.
- The furnace flue shall be entirely accessible for inspection and replacement.
- The furnace flue shall not be connected to the same chimney flue as one having a fireplace connection, unless the latter is permanently sealed.
- No damper shall be installed in the flue pipe of any gas appliance.
- 12. Where chimneys are not fully lined with tile, as now required by city building ordinance, it is required that a metal liner be installed the full chimney length from the flue opening to the top of the chimney.
- 13. No installation will be approved unless there is a clean-out installed below the flue entrance to the chimney. When an approved flue liner is installed with "tee" connection, this constitutes compliance with this requirement.

At the completion of the installation of the entire system, the contractor should clean the inside of the unit to remove dirt and dust therefrom, so that the heated air will be clean before entering the duct system. The contractor shall make all air delivery and temperature tests, setting all dampers and louvres in a locked position after adjustments have been made to secure satisfactory distribution of air to all parts of premises heated.



No. 300—suitable for various types of units.



No.305—specifically designed for a pan mounted in the bonnet of conventional type warm air furnace.

# HERE'S WHY

# M-VB

# HUMIDIFIER VALVES ARE

**Because:** Both No. 300 and No. 305 have the valve mechanism mounted *outside* of the furnace or air conditioning

unit...and no other humidifier valve of comparable quality and price offers you this important feature.

Because: Both of these M-VB valves have the M-VB pyrex glass float that licks all corrosion troubles due to the mineral content of the water.

And only M-VB gives you this feature.

**Because:** No. 300 and No. 305 have large passageways in the valves that insure minimum splashing and water rush even under relatively high pressures.

Because: M-VB humidifier valves—like all M-VB products—are absolute quality throughout. These valves have heavy brass castings and superb machining. They're low in price yet big in size and value.

If you manufacture—or sell—or install warm air furnaces or air conditioning equipment, get full details right away from M-VB or your Manufacturer.



M-VB

MORENCY-VAN BUREN DIVISION SCOVILL MANUFACTURING CO.

Sturgis, Michigan

SCOVILL SAVES YOU TIME IN SELLING - TIME IN INSTALLING

Complete lines of humidifier valves maintained at Waterville, Conn.—San Francisco and Los Angeles, California

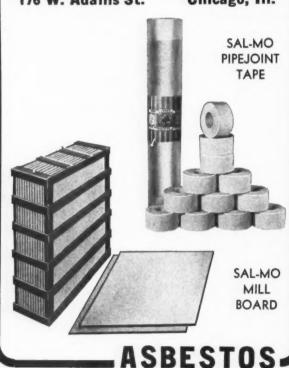


Y OUR jobber knows the quality of all SAL-MO Asbestos Products and can quickly furnish you with the proper materials for insulation of all types of Warm Air Heating and Air Conditioning Equipment. Other well known SAL-MO products are, Furnace Cements, Flexible Asbestos Jackets for hot water tanks and Coverings for all kinds of Steam and Hot Water Pipes.

SEE YOUR NEAREST JOBBER FOR SAL-MO WARM AIR HEATING INSULATION

# SALL MOUNTAIN CO.

176 W. Adams St. Chicago, III.



# Evaporative Cooling For Homes—Rummel

(Continued from page 108)

94 F. and the outside wet-bulb temperature 75 F. were 83 F. dry-bulb and a relative humidity of 70 per cent—the setting of the humidistat. The temperature in the attic during this same time was 87 F.

Readings were taken of the outside air wet- and dry-bulb temperatures as it entered the unit at the inlet louver and also of the air as it was leaving the house through the ceiling grille. These readings were taken under different outdoor weather conditions with the average result that on days when it was cloudy and the dry-bulb temperature was fairly low, the wet-bulb temperature increased approximately 0.6 F. after having passed through the house, and approximately 0.8 F. on days of sunshine and high outside dry-bulb temperatures but with approximately the same wet-bulb temperature.

On the basis of the increase in wet-bulb temperature of the air after passing through the house, the equivalent heat removal amounts to 1.45 and 1.97 tons of refrigeration, respectively.

In addition, the difference in heat flow from the attic space to the rooms below is greatly reduced. Attic temperatures in the location of this test are often as high as 140 F., and the difference in heat flow when the attic temperature is only 87 F. amounts to a reduction of approximately 40,000 B.t.u. per hour or the equivalent of  $3\frac{1}{3}$  tons of refrigeration.

#### Results With Reduced Air Volume

Similar studies were made when the air flow was reduced until the amount of air leaving the house through the exhaust grills was 5840 C.F.M. and 3380 C.F.M.

The setting of the air flow at 7130 C.F.M. and 5840 C.F.M. was permitted to remain for several weeks and expressions of comfort from people who were in the house for long and short periods of time were tabulated.

The following is a summation of the personal reactions to the three air deliveries:

AIR FLOW IN CFM	Time in Minutes for One Air Change in House	REACTION
7130 5840	1.3 1.59	Comfortable Fairly comfortable with just a slight sensation of a too
3380	2.75	humid condition Uncomfortable

An effort was made to determine the air velocity at different locations in each room. First a direct reading air velocity meter was used, but

these readings indicated rather definitely that there was a considerable turbulent action of the air in all parts of the room. At points within one foot of the walls positive and negative readings were observed in three different directions. After it became evident that no definite measure of air movement could be determined with this instrument it was thought that a more average determination could be made by means of the anemometer. After several trial readings were taken, it was determined that the most positive readings could be obtained on the four walls of the room at the breathing level height. Even with these readings it was quite evident that the air movement as recorded was not the true air velocity

f

al

le

ls

al

c-

ut

Table 1—Air Movement and Eective Temperatures in Test House With Direct Evaporative Cooling

Room		VEMENT I	IN FEET	Effective Temperature 83 deg DB-75 deg WB 70% RH					
	MAXI- MUM }	MINI- MUM	AVER-	MAXI- MUM	MINI- MUM	AVER-			
Living Room	90 120 115 160 220	42 70 60 82 160	68 92 88 133 179	77.9 77.3 77.5 76.9 76.1	78.3 78.0 78.2 77.9 76.9	78 77.8 77.9 77.1 76.8			

due to the turbulent action of the air. This turbulent action was quite noticeable, since in standing in any part of the room one could feel air movement on all parts of the body.

From the readings obtained it was found that only by using a Kata thermometer could a true reading of the air movement be obtained and accordingly a set of readings was taken with a Kata thermometer at a level 5 ft. above the floor line. The average of these Kata thermometer readings taken at a distance of approximately 24 in. from the wall and the anemometer readings taken directly against the wall are shown in Fig. 6. These readings were taken when the air flow was 7130 C.F.M.

Another set of readings was taken at a level 3 ft. above the floor and these readings showed a velocity about 10 per cent less than at the 5 ft. level.

The accompanying Table 1 gives the average air velocity in each room with the corresponding effective temperatures as determined from the American Society of Heating and Ventilating Engineers Comfort Chart.

The results of these readings show that there is a variation in the effective temperature in different parts of the house from a minimum of 76.1 deg., corresponding to an air movement of 220 F.P.M., to a maximum of 78.3 deg., corresponding to a 42 F.P.M. air movement with an average condition of 77.8 deg., corresponding to a 92 F.P.M. movement.

To obtain a 761/2 deg. E.T. with an average air

# The BIG Buy for 1941

Price, Quality and Profits

Send for literature and prices on Calesco's full line of heating equipment.

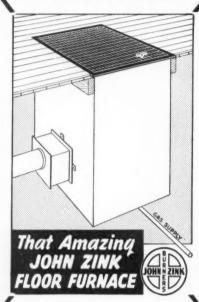
- Warm air conditioning units. 3 sizes in 3 styles.
- Copper tank hot water heaters from 14 g.p.h. to 600 g.p.h.
- NEW Bronz boiler and all copper forced hot water heating. Supply for domestic water thru mixing valve. Sold as a package unit all but radiation.
- Gun type oil burners. CS75-39 approved.
- Vaporizing burners for bake ovens and hotel ranges.
- Draft regulators.

CALESCO - Lynn, Mass.

# JOHN ZINK

One of the largest manufacturers of Gas and Oil Burners in the world manufactures a - - - - - - -

# FLOOR FURNACE



As you would expect this Furnace features a larger, improved combustion chamber and a One-port Non-plugging Gas Burner.

# John Zink Low Pressure Burners

for

DOMESTIC FURNACES
HEATING BOILERS
POWER BOILERS
GASOLINE PLANT BOILERS

Aggressive Dealers Write for Details

# **John Zink Company**

4401 S. Peoria Ave.
Tulsa, Okla.

New York City

movement of 92 F.P.M. at a 70 per cent relative humidity, the indoor conditions should be approximately  $73\frac{1}{2}$  F. wet-bulb and  $81\frac{1}{2}$  F. drybulb.

It was noted that for those people who entered and remained inside the house the average condition was comfortable, with an increased comfort noted when in the hallway, where the air movement was the highest, with no objection to the higher air movement.

The results of these investigations and tests indicate rather conclusively that in this locality the conditions that can be obtained, when the installation is made and operated as previously described, will prove satisfactory to the average home owner. However, it is felt that the conditions obtained in this investigation are about at the upper limit of comfort conditions, and any condition of higher indoor effective temperature would not be acceptable.

### Technical Code— Precalculated

(Continued from page 119)

most of the factors commonly used.

After this is done, the results are totaled across for each room and the result placed in the BTU per deg. TD column, as shown. Then this column is added up and the total, 713, is placed in the bottom *total* row. For purposes of checking, the totals of the other columns may be totaled across to the BTU per Deg. TD column. These totals should agree. The cubics are then added.

To find the total heat loss, the total BTU per deg TD, 713, is multiplied by the temperature difference, 80, making a total of 57,040 BTU per hour. From this point, the next step will be to determine the CFM requirements.

### Konzo-Automatic Controls

(Continued from page 132)

alone, do you consider it as a system No. 1 control?

Answer 23.—The two-speed blower control is a slight modification of system No. 1. Instead of one temperature range in the bonnet to control one fan speed, the two-speed blower control has two bonnet temperature ranges to control two fan speeds. The low range of bonnet temperatures controls the low speed operation of the blower and the high range of bonnet temperatures controls the high speed operation.

[To be Continued]

### Six Common Complaints in Oil Burner Service

)-

S

n

e e S

S

r

e r

1

ol

S

(Continued from page 114)

or lack of ignition. It is advisable to do this checking with the furnace door open. If oil spray can be seen in the furnace, shut the burner off immediately and determine why it is not igniting. Remove electrode assembly and clean off any soot which may have accumulated on it. Adjust the contacts properly. Before replacing the electrode assembly short across the tranformer contacts with an insulated screw driver to make sure the transformer is not defective. If there is no spark test the primary side of the transformer with a test lamp. If the light burns the transformer is defective. If the light does not burn, the wiring from the relay to the transformer is defective or the wiring in the relay itself is defective. Make sure that all wiring connections are soldered.

If, when the burner motor runs, there is no oil being delivered to the combustion chamber, loosen the fitting where the pump connects to the nozzle feed pipe. If oil squirts out at this point, the nozzle is clogged. Never use wire or any metal in cleaning a nozzle. A match stick sharpened will work satisfactorily without danger of damaging the nozzle. If oil does not squirt out, the pump or feed line may be air bound, the fuel supply may be exhausted or, the oil filter, if one is used, may need cleaning or replacing. If there is oil in the tank, loosen the plug provided on the pump for purging the air until oil appears. Check all pipe fitting to make sure there are no leaks. A slight leak will cause the pump to become air bound.

If, when the safety control is reset, the relay engages but the burner does not start, reset the motor overload cutout switch on the burner motor if one is provided. If the motor still does not run. check the wiring at the burner with a test lamp. If the light burns the motor is stuck or defective. If it does not burn, check the wiring from the relay to the burner and clean the relay contacts.

If the relay does not engage when the safety control is reset make sure the control is in the starting or cold position and short across the thermostat connections on the safety control. If the relay then engages either the wiring from the thermostat to the safety control is defective, or the contacts on the thermostat are not engaged. To clean the thermosat contacts draw a piece of hard surface paper between them. Do not use newspaper.

If the burner runs continuously and cannot be shut off there is a short in the wiring from the thermostat to the safety control, or the system is grounded in some way. In wiring the burner it is important that the hot line is run through the safety and limit controls. Determine which is the hot line by means of a test lamp.

# BINKLEY

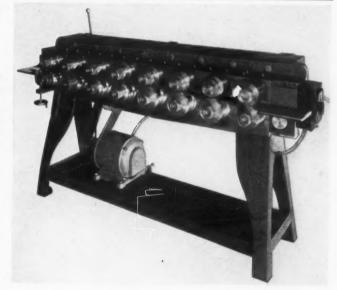
# No. 14 COLD ROLL FORMING MACHINE

Illustrated at right is one of the most popular machines in the Binkley line of cold roll forming units. This is a sturdy, solidly built machine for forming a wide variety of locks and shapes. Many types of tubing, channels, angles, screen frames, ornamental trim moldings, cleats, etc., can be formed in one pass through the machine. The important features of this machine are:

- A three speed transmission to permit forming of both heavy and light metals at the most efficient speed.
- Extra capacity needle bearings to minimize friction and promote long life and uninterrupted service.
- 3. Roll stands individually adjustable for different gauges of metal. 4. Adjustment of the inlet and outlet guides is very simple and
- 5. All bearings are easily and quickly lubricated by pressure gun. With roll pitch line speeds up to 100 feet per minute, this is the ideal production unit for the moderate sized shop.

### SPECIFICATIONS:

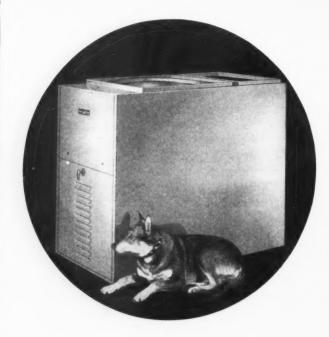
- 1. 5 h. p. motor 1 belt drive, push button starter switch.
- 2. Three speeds forward, one reverse-roll pitch line speeds 30, 55 and 100 feet per minute.
- 3. Overall length of machine 811/2", overall height 50".
- Roll shaft diameter 11/2" through rolls, 13/4" through block. Special alloy shafts and gears. Roll centers vertical 41/2" hori-
- 5. Rolls quickly changed by loosening roll shaft nuts.
- Special outboard yokes and extended shafts available for wide blanks or extra heavy material.
- 7. Approximate weight of machine, 2600 lb.



We build other units both smaller and larger than our No. 14, designing and making to order special rolls for these machines to form the

Consult our Engineering Department in regard to the type of machine and rolls best suited for your special forming operations.

BINKLEY MFG. CO. WARRENTON.



# OIL ECONOMY "85"

Oil Economy 85 . . . the unit designed for the new type of smaller home—26" wide—51" long—40" high—the green enameled jacket encloses burner—Shipped complete—all controls—no extras to buy . . . really a heating and winter air conditioning **Unit**—Metal combustion chamber — Draft regulator—separate oil filter—humidifier and most important of all — Pressure type Oil Burner of modern design and proven satisfaction.

Send for catalog of Oil Economy 85 and other International Products.

# INTERNATIONAL HEATER COMPANY

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.

NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.

STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES

### National Warm Air Convention

(Continued from page 170)

ing Conference would be held March 24, 25, 26 and 27 in East Lansing. There will be a section for instruction of beginners using a small house; a section for advanced heating students who will design an installation for a large house using zone distribution; a third section for those who wish to study cooling; and, for the first time, a fourth section which will study the design of a remodeling installation where forced warm air replaces an existing gravity system.

### Home Study Course for Dealers

John W. Norris, chairman of the industry training course committee, announced that because all manufacturer members of the committee have been unusually busy it was impossible for the committee to set up a definite recommendation for training but that some of the things which the committee is considering are:

1—Any such instruction course must be very simple and basic.

2—The course should be definitely practical and should avoid as much theoretical discussion as possible.

3—Such important design consideration as the control and control apparatus, the firing device and its operation, the balancing of a system should be given preference over theoretical discussion.

4—The proposed course should include study of heat loss, sizing of piping, sizing of equipment, location of registers, selection of controls, control systems, shop pipe fabrication, large building design, trouble jobs, theoretical air conditioning, oil burner problems, stoker problems, equipment designs, attic fan cooling, and cold water cooling.

Up to date the committee has considered several methods whereby such a course of instruction can be offered. The committee feels that such a course should be a home study course and each section of instruction should require about one week's time for completion. The cost should be very low. The course of instruction should be written by members of the industry. The necessary personnel to mail out the courses, check the papers, and maintain contact with the students must be selected soon.

#### Air Information Please

Two of the interesting features of the annual program were "Air Information Please" and "Mrs. Huffy Buys Another Furnace."

Air Information Please was a round table, extemporaneous discussion by qualified speakers of questions raised by members of the industry. Since this was the first time that such a discussion was attempted, questions were submitted in written form prior to the meeting, but the speak-

# 47 Factory Tests, a Bonus to Control Users



ENN-BUILT controls safeguard the dealer's profit through the period of service responsibility - build customer good will by operating dependably through the years. Designed with the serviceman's problems in mind they save installation time -cut installed costs.

The accuracy and dependability of Penn-built controls is based upon engineering advances which achieve greater simplicity of structureplus scores of specially devised inspections to check the hair-line precision of manufacture.

For customer satisfaction and dealer profit specify Penn-built controls for all heating, ventilating and air conditioning applications.

Penn Electric Switch Company, Goshen, Indiana. In Canada: Powerlite Devices, Ltd., Penn Electric Switch Division, Toronto, Ont. Export: 100 Varick St., New York City. Branches, representatives and distributors in all principal cities.

# PAYNEHEAT BATTALION of BUSINESS BUILDERS

# Your Profit Defenders ..

Out on the sales front, you need "sure-fire ammunition." Fully-vented PAYNE gas heating appliances defend your profits with a veritable "barrage" of advantages: Public Acceptance—Nationally advertised, nationally known for quality and dependability. Sound Engineering-Advanced, streamlined design by gas heating specialists with more than a quarter century of experience. Double Testing-Meeting rigid requirements of both the A.G.A. and the splendidly-equipped PAYNE Testing Laboratory. A Take the offensive with PAYNEHEAT in your 1941 campaign.



ZONEAIR UNIT Heats, cir-LONEAIR UNIT Heats, circulates, filters, ventilates, and humidifies—automatically.

Services one room, a wing, or entire house.



FLOOR FURNACE Exclu-FLOOR FURNACE Exclusive design and features save on gas, distribute heat uniformly. Fully vented for efficiency, safety, comfort.

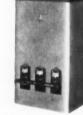


FORCED AIR UNIT For small home. Warm air in winter, circulated cool air in summer—always healthfully filtered,



MODERN CONSOLE ty, utility and economy. Three harmonizing baked enamel finishes, six sizes.





FURNACE Touch a button, and fill your home with controlled, comfortable, circulated heat. Advanced design.



SPACESAVER UNIT-A forced air heating unit for the home, shop or industrial plant where space is an important factor.





FOR DETAILS OF OUR GENEROUS DEALER PLAN, WRITE J. H. KEBER, SALES MANAGER



ers who discussed the questions had not seen the questions before the speaker was called upon. Speakers who participated were—Chairman L. R. Taylor; members—Professor S. Konzo, E. B. Lau, C. W. Nessell, T. J. Pearson, F. G. Sedgwick. A variety of questions on a variety of subjects were presented with lively comment from the floor. It would be impossible to present these problems and the answers without a stenographic report.

### Mrs. Huffy Buys a Furnace

"Mrs. Huffy Buys Another Furnace" is a humorous skit produced by Williamson Furnace Co. for dealer demonstration, but the humor does not conceal the really serious sales ideas and methods. As the pictures of various scenes in the skit indicate Mrs. Huffy bought a furnace cleaning service from a high-pressure sales organization only to find her furnace full of holes and cracks when the furnace was properly spread out on the basement floor. Mrs. Huffy's husband, returning home to break the sad news to Mrs. Huffy that he and "the boys" were planning a trip to Chicago ended up by cancelling the trip in favor of an expenditure for a new furnace. The excellence of the dialog and the ability of the characters (all Williamson employees) was so true to life that the audience found dozens of places at which to say "Isn't that the truth."

ing

cen-

eet-

3.A.

Test-

vith ign.

OLE

aked

sizes.

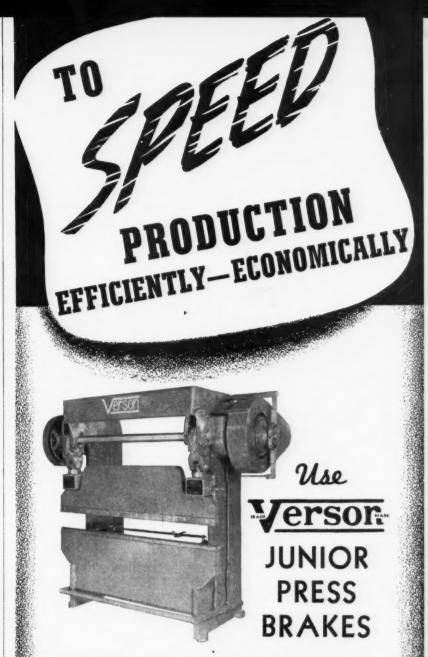
### Research and Codes Reports

F. G. Sedgwick, chairman of the Research Advisory committee, reported briefly on some of last summer's studies in cooling by drying and announced that a more complete report would be forthcoming soon. Mr. Sedgwick declared that at least two years' research work has been set up and pointed out that the value of our research program is strongly emphasized by the fact that competition is following in our footsteps.

B. F. McLouth, chairman of the Codes committee, reported the third edition of the Technical Code now available and brought to the audience's attention the very important cooperative work between the Codes committee and the National Board of Fire Underwriters during 1940 in the revision of the NBFU Bulletin No. 90. Mr. Mc-Louth reported that practically all the changes suggested by our industry committee have been accepted by the NBFU and other recommendations, not yet accepted, very likely will be accepted. The next problem which the codes committee will tackle will be the inclusion in all 3 codes (Standard Code, Practical Code, Technical Code) a method of converting present pipe size factors to a direct Btu method. Eventually, said Mr. McLouth, it is likely that the present factor method of determining pipe size be replaced by the direct Btu method. Mr. McLouth also announced that a new heat loss sheet for gravity installations has been prepared and will

be ready for distribution shortly.

Managing Director George Boeddener announced that as a result of our Association ac-



VERSON Junior Press Brakes have been designed and made available to help you effect economies not possible when large expensive machines are used on short heavy jobs or longer light jobs. Only in Verson Junior Press Brakes can you find all of the essential features ordinarily identified with much larger units. Their substantial construction and balanced distribution of steel plate assures accurate bends the full length of the bed and ram. Other features make this a SAFE—DEPENDABLE—EFFICIENT PRODUCTION TOOL.

Your operators will like the new Verson Junior Press Brakes—and your cost department will marvel at the savings they will bring you.

The seven sizes of Verson Junior Press Brakes meet every requirement demanded of a FAST—POWERFUL —MODERATELY PRICED machine.

Whatever your job may be there is a VERSON Press Brake to handle it FASTER — BETTER and CHEAPER. Ask for our new bulletin, JPB 40, it gives all the facts. Write today.

# VERSON ALLSTEEL PRESS CO.

9302-A S. KENWOOD AVENUE • CHICAGO, ILL.

tivities warm air heating has been retained in all Army housing specifications. Mr. Boeddener pointed out that whereas only a comparatively few manufacturers have been able to furnish the sizes of furnaces required for Army barracks, our industry has obtained untold publicity from the sale of warm air equipment.

The technical session included reports on smokeless combustion, summer cooling by drying, resistance of registers and stackheads.

### **Smokeless Combustion**

Professor J. R. Fellows of the University of Illinois outlined some of the problems of attempting to burn high volatile bituminous coal in the usual type of warm air furnace. Professor Fellows (as a personal research project) has been conducting investigations in this problem for a number of years and has developed a special furnace and also a special coal magazine readily applicable in any type of warm air furnace which makes the burning of high volatile bituminous coal possible with practically no smoke. Professor Fellows showed lantern slides of the coal chute and the special furnace and described the chemical reaction which takes place during the burning of this fuel in the average furnace and the reaction which occurs employing the new device.

Briefly the problem is to supply sufficient secondary air to consume all of the gases generated in the fuel bed; 2-to provide a complete air mixing during the combustion process; 3—gases produced during combustion must come in direct contact with surfaces hot enough to ignite the gases. The average warm air furnace does not meet these requirements, but by use of the new magazine all of these requirements are readily obtained. By employing the special magazine the following advantages are obtained—practically no smoke is generated, soot is practically eliminated, temperature uniformity is assured, less frequent service is necessary, there are no clinkers, response of the heating plant to the thermostat is more rapid, smaller sizes of coal (usually cheaper), can be used.

### Cooling by Drying

Professor A. P. Kratz described the insulation in the walls and ceilings of the Research Residence and the Silica Gel apparatus used during last summer's test. The warm air furnace and fan system were remodeled in order to include the new apparatus and with the rearrangement it was possible to maintain complete and independent control of the relative humidity irrespective of the cooling provided by other means. Apparatus and the system were so arranged that either outside air or recirculated air could be passed first through a mixing chamber, then through the dehumidifier, then through the dry air cooler, then through a resaturation cooler consisting of a fan and a squirrel cage picking up water, then through the fan, furnace and duct

# Bigger profits Bigger Sales Eustomer Satisfaction For Alert Dealers -





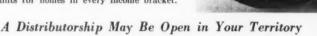


A complete line of pressure and vaporizing Conversion burners and furnace units for homes in every income bracket.

ET Autocrat help make 1941 a year of consistent profit for you. Everything is in your favor; building is booming . . . homeowners are sold on the advantages of oil heat . . . and Autocrat gives you prices which enable you to compete and still make money. Autocrat is trouble-free, safe, dependable, economical and

easy to install. Volume production and complete manufacturing facilities enable us to maintain famous Autocrat quality at low cost.

Hundreds of successful Autocrat dealers, large and small, recommend this line to you. Don't sacrifice quality for price. Stop pouring profits back into high servicing costs. Make Autocrat your line and build prestige along with volume and profits.



Write or Wire Today for Full Details.

# ER COMPANY CEDAR RAP



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

**ALTER EGO:** I know you have your doubts about the need for *two* welding controls. But that's a good omen.

Good? In what way?

ALTER EGO: Well, to believe with certainty, we all must begin with modest doubts. Then, as we kick over the doubts one by one, the certainty is reinforced.

Then, if I want to make a sound conclusion, it's up to me to start kicking over a few doubts.

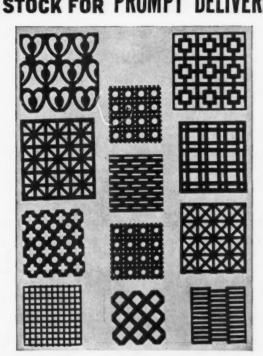
ALTER EGO: Right. And there's an army of veteran Welders that'll help you get rid of your D. T.'s.

LINCOLN SUGGESTS: Ask the experienced welders how Dual Continuous Control assures greater benefits from welding. They'll tell you that Dual Continuous Control is the only means of varying both the TYPE of arc and the arc INTENSITY. This flexibility enables them to get the EXACT welding arc for maximum quality and maximum speed on every job. The value of this welder control—to you—is explained fully in "The New Arc Welding Technique," Bulletin 412. (Gratis on request.)

Copyright 1941. The Lincoln Electric Co.

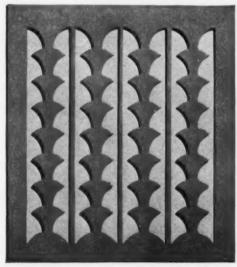
LINCOLN-SHIELD-ARE WELDING THE UNCOLN ELECTRIC COMPANY Cleveland, Obio

# PERFORATED METALS AND INDUSTRIAL SCREENS IN STOCK FOR PROMPT DELIVERIES



Fancy panels constructed for easy bending. These panels are especially adapted for use as stove casings and similar applications, made to your specifications.

We make a complete line of perforated metals for Screening, Sifting, Draining, Machinery Guards, etc.



Newly Designed Stamped Radiator Grille. We can supply you with registers, grilles and industrial screens in any quantity and we'll send you a catalog on receipt of your request.

Write today.

STANDARD STAMPING & PERFORATING CO. 3137 W. 49th Pl. Chicago, III.

# DOLLARS OR DIMES . . . WHAT DO YOU WANT?

# Cole's Gas Fired Floor Furnaces Are the Quick-Selling Answer to **Scores of Heating Questions**

Selling Cole's Gas Fired Floor Furnaces pays big dividends in dollars and in customer satisfaction. In new homes for the finest in low cost automatic heat, sell Cole . . . for old homes, replacement jobs or for auxiliary equipment, sell Cole. NOW is the time to talk Cole's Gas Fired Floor Furnaces and NOW is the time for you to cash in on the demand for economical, trouble-free, dependable heat.



Cole Gas Fired Floor Furnaces are approved by the AGA. A full vitreous porcelain enamel inner heating unit assures the most in durability and efficiency.

Other features include large heating surface and long delayed flue travel for maximum heat from any gas; unit crimped and sealed by a patented process for gas tight and stay tight construction; three walled cas-

ing of galvanized steel or full porcelain casing at small extra cost.

Combination safety pilot and automatic thermostatic control also available.

Write for full details today!



# COLE HOT BLAST MFG. CO.

3108 WEST 51st STREET

CHICAGO, ILL.

system into the room. A complete report will be published early in 1941 but the conclusions are important.

These conclusions are:

1. A method of operation under which the cooling plant is started when the indoor effective temperature rises to 74° after a period of supplementary cooling with outdoor air at night is more satisfactory than a method by which the cooling plant is started when the indoor dry bulb temperature rises to 81°F.

2. By the use of the dehydrating unit it is possible to maintain comparatively uniform relative humidity, consequently uniform comfort conditions irrespective of whether the plant operates

continuously or intermittently.

3. The use of insulation in the side walls and ceilings effected a saving of approximately 33% in the sensible heat load and of the order of 25% in the total heat load of the Research Residence.

4. The discovered lack of agreement between the calculated design moisture load and the actual moisture load indicates that moisture permeating the structure may be independent of the amount of infiltration or ventilation air and suggests that some revision may be advisable in the commonly accepted methods for calculating moisture load.

#### Resistance of Stackheads

Professor S. Konzo continued his discussion on the resistance of registers and stackheads. Summarizing research up to date, Professor Konzo pointed out that currently manufacturers are furnishing a fan rated to deliver its capacity against the resistance of the return and supply side of the system and usually include in this capacity the resistance of the furnace casing. The resistance which has not been considered until the beginning of the present series of investigations is found in the stackhead and the register face.

Register face resistance was discussed last June and since that time the research has been continued on stackheads. The resistance of the register face depends upon the type of opening, the construction of the face, the width of the border. In air conditioning registers some additional resistance is set up if the vanes of the face are turned outward beyond a 30° angle. Beyond 30° vane deflection resistance increases very

Research shows that a straight duct behind the register face shows a resistance of only .01 total pressure, but a stackhead shows an added resistance of .04 up to .05 total pressure or more depending upon the register face construction. Transferring this resistance to terms of lengths of straight pipe, the investigations disclosed that a typical stackhead on a 31/2 x 12 stack offers a resistance equal to 43 ft. of straight pipe. This includes the stackhead and the face itself.

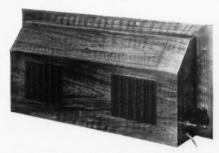
Several arrangements of turning vanes in the throat of the stackhead to reduce resistance were tested. Filling the radius of the stackhead with vanes, reduced the resistance to 92%. 100% is

# PREPARE NOW! for the heat wave market



### ROOM COOLERS

Completely self-contained. Portable. Stressing beautiful appearance and economy of operation. 3/4 ton capacity. Very quiet running. Of improved design and incorporating most recent engineering features. Can be plugged into any ordinary 110 V. 60 Cy. electrical outlet.



### **ELECTRIC WINDOW VENTILATORS**

To provide filtered, fresh air and controlled ventilation to any room. Controls give flexibility and adapt the unit to individual needs. Smooth running and quiet. The tastefully finished, all steel cabinets make them harmonize with surroundings. Installation is simple and clean-cut. Well adapted to single offices or multiple installations in large spaces.



### **EXHAUST VENTILATORS**

Commercial and industrial Exhaust Fans of most recent design and development. Quiet, smooth-running and operated at low cost. Direct drive or belt-driven models. All standard sizes and capacities. Quality-built. Very high efficiencies.

AIR CONDITIONING

Other Airmode products:

Attic Fans

Motor-operated shutters and ceiling louvres Air Circulators

Fully automatic Humidifiers
—large capacities, and
portable units for two

and three room application.

Kitchen Exhaust Ventilators

AIRMODE MANUFACTURING CO. - 325 W. HURON STREET - CHICAGO, ILL.

# Elgo/entilating Specialties

# A Shutter With Unusual Features

Tightest Fitting
Shutter
on the
Market

(1) Louvres weatherstripped on inner edge, instead of on outer edge, making shutters open more easily and fit more snugly. Tightest fitting shutter on the market.

(2) Swivel-joint with hardened steel bushing. No wear or rattle. Good for the life of the shutter.

More sensitive than any other automatic shutter, and longer lasting. Built to any size, square or rectangular.



# All-Steel Motorized Shutter

Used for exhaust ventilation in industrial, commercial and residential buildings. Automatically controlled by fan switch. Six-second opening. Positive closing. Storm-proof. All-steel construction.



Elgo Shutter & Manufacturing Co.

6966 W. JEFFERSON

DETROIT, MICH.

Elgo Shutters are distributed through fan and air conditioning equipment manufacturers

Elgo Shutter & Mfg. Co. 6966 W. Jefferson, Detroit, Mich. Free CATALOG

Please send catalog showing the items checked below:

Automatic Shutters Stationary Shutters Hand Operated Shutters Ceiling Dampers Balanced Vent Units Motorized Shutters

Name

Address

City

State

#### Officers and Directors

President-C. A. Olsen.

First VP-H. S. Sharp.

Second VP-Shirley Percival.

Managing Director-George Boeddener.

Directors:

R. W. Blanchard.

C. Ackerson.

B. M. Allen.

Perl S. Miller.

H. P. Mueller.

C. W. Nessell.

M. D. Rose.

F. G. Sedgwick.

L. R. Taylor.

represented by a stackhead without any vanes. The use of 7 vanes reduced the resistance to 86%; the use of 4 vanes reduced the resistance to 61%; the use of 5 vanes reduced the resistance to 72%. A simple 2-vane application with the vanes placed at the 1/3 points in the radius reduced resistance to 64% of the resistance without vanes. Complicated, long vanes extending down below the throat of the stackhead reduced resistance to 54 to 61% or an equivalent length of pipe of 22 ft., but the complications arising due to application with this type of vane seems to be not worth the extra difficulty encountered and

the Research Residence feels that the 2-vane application may be the answer.

Investigations are also underway to determine the effect of register faces larger and smaller than the area of the stack.

The nominating committee recommended that because of the excellent work done by present officers, these men should be retained in office for another year.

No special entertainment was offered by the Association at this meeting, but a cocktail party with entertainment was offered at the Bowery by Grant Wilson, Inc., the Mercoid Co., the Armstrong Co., Maid-O-Mist, the Aldrich Co., and Air Control Products, Inc.

# News Items . . . .

### Right to Examine Records Upheld

Employers may not refuse the Wage and Hour Division access to their records on the ground that they believe they are not engaged in interstate commerce, Federal Judge Michael L. Igoe ruled in ordering the G. & C. Novelty Company, Chicago, to obey a subpoena issued by Thomas O'Malley, Regional Director, the Division was advised today.

Judge Igoe sustained the contention of attorneys for the Wage and Hour Division that the Division is not compelled to abide by an employer's determination that he is not engaged in interstate commerce, but has the

right to examine the employer's records.



### Adler Planetarium

(Continued from page 156)

The coping was fastened in place by means of bronze dowels set into the brickwork, through the copper and up into the granite coping. (Fig. 6.) There are two such dowels in each coping stone. Where the dowels extend through the copper a copper cap was formed in the shape of a brimmed hat with the brim portion soldered to the copper flashing.

At the base of the promenade wall and the gutter, the existing counter flashing was removed. (Fig. 6.) The existing base flashing was nailed to the brick wall by use of a specially constructed continuous strip about 11/2 inches wide, and concrete nails every eight inches. Before installing the strip, roofing mastic was laid in behind the flashing and over the new strip. The new 16ounce lead coated copper counter flashing was then installed into a raggle. This was merely the old raggle cut 1/4 inch wide and 11/2 inches deep. (Fig. 6.) The counterflashing was raised 1/8 inch on the back and after being set in the raggle was fastened in place by means of lead plugs 1 inch wide set 6 inches on centers. These plugs were hammered in with flat nosed tools and kept to within 3/8 inch of face of brickwork. After this the counterflashing was securely set in place and the remaining voids of the raggle were filled with elastic caulking compound. (Fig. 8.)

Where the promenade deck drains occurred, new ones were installed. These were brass bodied, standard drains, having a brass pipe screwed in at the bottom. (Fig. 6.) These pipes were inserted inside of existing downspouts, and rubber gaskets and roofing mastic were used to seal the joint. The space between the new drain and the present concrete of the deck was filled in with shrinkproof cement. The next procedure was to cut a raggle into the existing concrete on three sides of the drain away from the wall. This raggle was made 34 inch wide and 1 inch deep. Into it was set a copper flashing pan the other end of which was set into a clamping ring provided on the new drains. The copper flashing is held in place in the raggle by means of a brass bar 1/4 x 5/8 inch and 1/4 inch round brass expansion bolts set into the concrete about 12 inches o. c. (Fig. 6.) On the wall side, the flashing pan was bent up and fastened the same as was the rest of the base flashing. All of the copper was set in roofing mastic. The counterflashing runs through in all instances around the entire wall of the promenade deck, and has expansion joints in it spaced at regular intervals.

Where the promenade deck joins the wall of the dome the base flashing was left in place and fastened the same as on the outside wall. The



• You need be satisfied with nothing less than the best for all your 1941 installations. Take the lead with Peerless and stay at the head of the procession through these advantages that Peerless gives you:

 Remarkably satisfactory performance demonstrated by thousands of installations over many years.

2. Attractive appearance in color, line and modern style to harmonize with any furnace installation.

 Selection of belt drive or direct drive with automatic control to meet the demands of any situation.

4. A product guaranteed by a manufacturer with 47 years of experience in building electric motors and blower equipment.

Mail the coupon for detail information or consult your nearest jobber.

Address

City



Peerless Blowers are made in both direct and belt drives. On belt drive units, motor may be mounted either rear or top. Fit any style furnace



THE.	Peerless electric co
	WARREN, OHIO
THE PER	RLESS ELECTRIC CO., WARREN, OHIO
	us more about your belt drive and direct drive blowers.
Name	

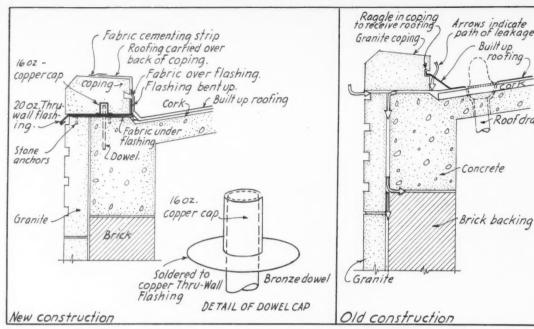


Fig. 14-Water entered coping at outside of lower deck as shown by the arrows. Passing between veneer and backup this water entered the building many feet from its en-trance. To stop these paths of travel a through wall flashing was installed as shown. Note especially the coping cap designed to act as a cap flashing.

DETAIL - 5 - LOWER DECK COPING

old counterflashing was removed and new counterflashing installed into a newly cut raggle in the brick, in the same manner as on the outside wall. (Fig. 5.)

Just below the granite, on the dome wall and above the brickwork, a copper drip mold was installed into a newly cut raggle and extended about 3/4 inch beyond the wall. This drip mold is held in place by means of lead plugs, as was described in the section on installation of the counterflashing.

After taking the necessary precautions that no water would be able to filter through to the underside of the roofing on the lower deck, the existing roofing was removed down to the concrete slab. A new cork insulation was applied in hot asphalt and a five-ply, twenty-year roof installed over it. Where the roofing joined the rear granite wall, it was run over a cant strip and up on the wall for a height of about five inches. A steel

Built up roofing

Roof drain



# YOUR FUTURE SALL

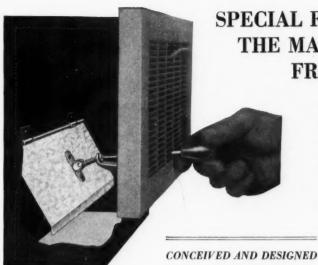
In your business, as in others, future sales depend on satisfying present buyers. For every customer has friends and neighbors; and if one of them becomes dissatisfied with the heating or air conditioning plant you install, however unjustly, that is bad business for you.

Disgruntled customers come, sometimes, from inefficiency of the actuating element of the control—perhaps only a slight leakage; or a little weakening under unexpectedly high heat. The results may easily be wasted fuel, uneven house temperatures, possibly injury to the heating plant. Certainly they will include higher service costs to you; and perhaps the loss of future sales.

All these evil results can be avoided by specifying Chace High Temperature Thermostatic Bimetal as the thermal responsive element of your controls. Chace Bimetals cannot leak . . . and will not weaken. They have been proved by many years service to be wholly dependable for the full life of the installation. Protect your future sales by insisting on Chace.

Control manufacturers are invited to consult us for type of Chace Thermostatic Bimetal best suited to meet specific demands.





MAYN AIR DAMPER

t

d

e

d

AN APPRECIATION

BY AN ENGINEER OF

NATIONAL REPUTE

CONTROLAIR, Inc. thanks all architects, engineers and heating contractors for their splendid support in recommending and using the MAYN AIR DAMPER. Your confidence in the merit and advantages of this product is sincerely appreciated.

THANK YOU!

# SPECIAL FEATURES THAT HAVE MADE THE MAYN AIR DAMPER POPULAR FROM COAST TO COAST

Only through recognition, by the dealer and heating engineer, of the inherent advantages of this modern and unique means of balancing all forced air systems has the MAYN AIR DAMPER become so popular from coast to coast.

The important part that this proven and exceptional damper plays in the business of heating and air conditioning engineers can best be appreciated from its following outstanding features:

- 1—Positive in control and locks automatically.
- 2—Accessible through the register face.
- 3—Tamper proof—a special tool is used.
- 4—Rattle-proof—noiseless.
- 5—Quick to install—inexpensive.
- 6—A profit maker.
- 7—A rapid one-man balancer.

# CONSULT YOUR JOBBER

OR WRITE US DIRECT

The MAYN AIR DAMPER is also available for Horizontal Branch Run Outlets, Return Air Intakes and Overhead Systems.

CONTROLAIR INC.

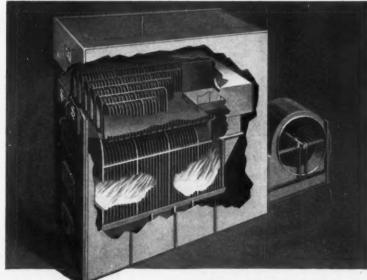
# For "HEAVYWEIGHT" Heating--

DO BIG THINGS with Streamline Warm Air Heaters. For barracks, hangars, factories, schools,—for any large building that demands economical heating,—Streamline is the most practical heater, because it is designed especially for these "Big" jobs. Single heaters range from 350,000 to 1,200,000 B.T.U. capacity; batteries can be assembled to handle any heating or ventilating load.

LASTING EFFICIENCY. High performance, yearin and year-out, is built into each heater. The ingenious "streamlined" air-flow mines the maximum heat from each pound of fuel. Heavyweight cast-iron construction, plus exclusive "free expansion," add extra years to this efficiency. For your large-capacity heating jobs, benefit from modern engineering and specify Streamline!

**EVERY** Streamline Heater is adaptable to gas, oil, or coal firing. For quicker installation, every heater is factory pre-assembled. Write for fuller details. Let our price list show you how Streamline's superior design gives you more for your heating dollar.





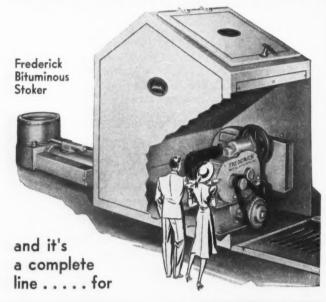
Write to THERMAL ENGINEERING ASSOCIATES

1618 Northshore Ave., Chicago, Illinois

# FREDERICK STOKERS

Sell Jhemselves

WHEN PROSPECTS GET THE "INSIDE STORY".



## BITUMINOUS and ANTHRACITE

Simplicity of design tells a story of fool-proof operation . . . says, "Here's a stoker you can install and forget!" And, with the comfort, convenience and economy Frederick Stokers assure—it's a convincing story ringing up sales for dealers all over the country!



### A TYPE for EVERY HOME and HEATING PLANT

Ten models, hopper-feed and bin-feed, five capacities squarely meet the variety of home heating problems. Installation is quick and easy. And Frederick prices are well within the limits of modest budgets—your "average customer" is a live prospect for Frederick automatic heat!

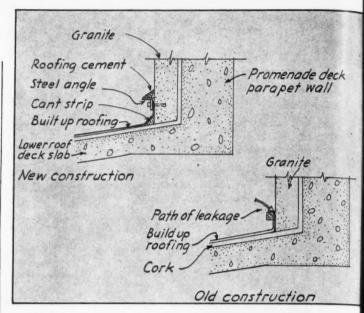
 Dealers are making important money on the Frederick Stoker—and there is some good territory still open! Write for liberal Dealer's Proposition; no obligation.

# THE FREDERICK IRON & STEEL COMPANY

**Eighth Street** 

FREDERICK, MARYLAND

"Builders of Good Stokers for 20 Years"



# DETAIL-G- JUNCTION OF LOWER DECK AND PROMENADE PARAPET WALL

Fig. 15—Old and new construction at point 6 (Fig. 3). The old flashing separated, permitting water to enter behind the flashing. New construction used a bolted angle and a heavy cement application to seal out water.

angle was clamped over the roofing and held in place by means of expansion bolts. The top of the angle was covered with an elastic roofing cement. (Fig. 15.)

The coping stone of the lower deck was removed all around the building. The exposed top of granite and concrete backing was then covered over with a layer of fabric set in roofing cement. A twenty-ounce lead coated copper flashing was next laid over the fabric and over some bronze dowels that were placed in order to hold the coping stones. (Fig. 14.) Copper caps were used over the dowels and soldered to the flashing in the same manner as described for the coping on the promenade level.

After the coping stones were set in a bed of mortar, the copper was bent up back of the stone for a distance of 3 inches and fabric was laid over the copper and cemented to the back of the granite. The roofing was then carried over a cant strip, applied to the back of the granite and carried over the top of the coping to within two inches of the front. A fabric strip was then applied over the roofing and granite in a roofing cement to close up the joint. (Fig. 14.)

The front end of the copper flashing was extended beyond the face of the granite and bent down at an angle to drip any water coming down the face of the granite. In all instances the edge of the copper flashing was doubled over a distance of ½ inch. New brass clamping rings and lead flashings were installed in all existing drains on this lower roof deck.

The top joints of all coping stones as well as all other joints in the exterior granite were filled with gun-grade caulking compound to a depth of one inch.



SPEED WORKS

SAVETIME

SATISTY CUSTOMERS!

BOOST SALES!

CUT COSTS!

1.0 .0

D

·0.

K AND

0

.0.

0

n f

g

-5 p 7g

1-1e

ld

e.

g g

of

ne

id

ne

a

nd

VO

p-

ng

X-

nt vn

ge

is-

nd

ns

as

ed

of

41

Improved CONDUCTOR FASTENER



Plain or corrugated . . . copper or galvanized . . . round or square . . . for wood or brick . . . Klauer bas what you need! Made to offset pipe one inch from building. Get our prices now!

"Easy On" GALVANIZED



Manufactured from a solid strip of galvanized metal . . . reinforced where stem and hanger meet (at point of greatest wear) ... unusually strong ... exceptionally well constructed!

"Triple Twist" WIRE HANGERS

Extra wire in cross bar gives extra strength, longer life . . . selected heavy galvanized wire designed to hold back of trough higher than front, forcing overflow of water to flow away from the building.



NEW POCKET-SIZE FREE! CATALOG AND PRICES

Never selling chain stores or catalog houses . . . with dozens of exclusive products and features to give you a selling "edge" . . . located in the heart of the country for quick delivery and cheaper freight rates . . . Klauer is a fine old company with which to do business. But see for yourself—get our latest catalog and price list today!

Klaues MANUFACTURING CO., DUBUQUE, IOWA



- MAKE MOHEY! Roofs and Box Gutters, Valleys, Flashing
  - Sheet Steef, Corregated Sheets Skylights, Stock Tanks
- Ventilators and Cupolas
- Eaves Trough, Conductor Pipe and
- Metal Ceiling, Pressed Siding, Rolled Roofins
- Metal Lath and Corners
- Ridging, Comers, Battens, Shingles

# SHOUSINGS ASSEMBLE



Fan assemblies and wheels for every forced warm air heating and air condition-ing need.

ing need.

The complete assembly is offered in 11 standard sizes. Top mounted motor with adjustable base or bottom mounted motor with automatic belt adjustment are available.

Bishop and Babcock Blower Wheels in ten di-ameters in widths from 3" up; meet any capacity demand at any operating speed.

heavy gauge steel permit the assembly of bearing or motor supports directly on the housing without auxiliary supports. Any width in single or double inlet design.

Write for Bulletin 87 giving full data including capacities or have Bishop and Babcock engineers submit recommendations for your require-ments.

TERRITORIES AVAILABLE FOR REPRESENTATIVES

TheBISHOP&BABCOCK MFG.CO CLEVELAND, OHIO. REPRESENTATIVES IN PRINCIPAL CITIES

# QUALITY **EQUIPMENT-- FROM** HESS-- COSTS LESS

### DEALERS --- Write for our New 1941 Portfolio

By selling - repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

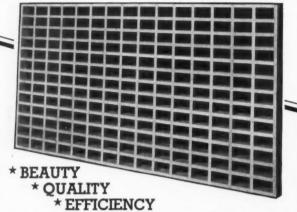
• . . HESS BLOWER FILTER UNITS HESS WELDED STEEL FURNACES HESS AUTOMATIC OIL BURNERS HESS AUTOMATIC COAL STOKERS

> ARE GREATEST VALUES AT LOWEST PRICES

The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan-helps Hess

WRITE FOR DEALER PORTFOLIO HESS WARMING & VENTILATING CO 1211-27 S. WESTERN AVE. Founded 1873 CHICAGO, ILLINOIS

# MARSH WOOD FACES



Any time you want an inexpensive, efficient register installation consistent with a modern, tasteful appearance, install Marsh Wood Faces. These superior faces are ideal for cold air ducts or air conditioning systems where symmetry of design as well as efficiency are to be considered.

Marsh Wood Faces are built to give long and satisfactory service using only the finest of selected kiln dried oak, accurately machined on specially designed machinery for the specific purpose of making Wood faces. Try Marsh Wood Faces on your next installation. You'll be pleasantly surprised at both the price and their excellent harmonizing qualities.

WRITE TODAY FOR CATALOG

MARSH LUMBER CO., INC. DOVER OHIO



1714 Penn St.

St. Joseph, Mo.

### Dingle Bookkeeping

(Continued from page 173)

ing would, of course, be charged to the "Interest Paid" account; insurance thereon would be charged to "Insurance—Fire"; and taxes to "Taxes—Real Estate and Personal." Repairs would be charged to an account to be called "Repairs—Building."

158—REPAIRS, DELIVERY EQUIPMENT.

159—REPAIRS, SHOP—These repair accounts will contain the cost of ordinary and necessary repairs to the delivery equipment and shop, respectively. Any expenditure for new equipment will, of course, not be charged here, but to the proper asset account.

160—SALARIES, OFFICE.

161—SALARIES, SELLING—As these account names indicate, salaries will be charged to these accounts as paid, or accrued. As has been discussed under "Accrued Wages" and "Accrued Taxes—Old Age Benefits" and "Accrued Taxes—Unemployment Compensation" it is now quite essential that all salaries and wages be kept in such account, or accounts, as will permit of easy audit by the field auditors of the State and Federal bureaus.

162—SELLING EXPENSES—To this account will be charged any expenses, such as travel or auto expense, incurred for the sales activities.

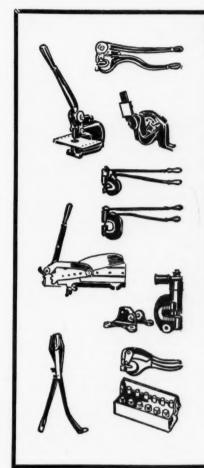
163—SUPPLIES USED—This account will contain such shop supplies used as are not charged direct to the cost of jobs. As discussed under account No. 8, "Inventory Supplies," shop supplies when purchased, will be charged to this inventory account and at the close of the month, or year, by inventory, determine the amount of shop supplies on hand and the difference between the inventory and the ledger account will be charged to this expense account, as supplies used.

164—TAXES, REAL ESTATE AND PER-SONAL—To this account will be charged monthly one-twelfth of the estimated year's cost of this expense, the offsetting credit to be entered in the account "Accrued Taxes—Real Estate and Personal." When taxes are paid, the charge will be to the Accrued account, rather than to this expense account.

165—TAXES, INCOME—To this account will be charged the expenditure for Income Taxes. While this account is here shown in the expense section, this item will be shown on the operating statement as "Other Expense" and not as an operating expense.

166—TAXES, OLD AGE BENEFITS—This expense account will contain that part of the Old

(Continued on page, 219)



est

be to

irs

Re-

T.

nts

ary re-

ent

the

ac-

l to

een

ued

in

asy red-

unt or

will not ssed hop this

nth,

t of

reen

be sed.

ER-

thly

this

the

Per-

1 be

ex-

will

xes.

ense

ting an

This Old

, 1941

guite WHITNEY-JENSEN TOOLS



OVER 80

**USEFUL TOOLS** 

PUNCHES

SHEARS

NOTCHERS

BENDERS

ETC., ETC.

# No. 75 DUPLEX ROLLING MACHINE

· For fast, uniformly accurate rolling of Pittsburgh Locks, Drive Cleats, and many other forms. TWO sets of rolls, fully adjustable. Special form rolls made to order. Capacity 18 ga., 38 feet per minute.

Write for New Catalog No. 14

# No. 58 and 68 FOOT PRESSES

 Ideal for numerous punching and for numerous punching and forming light production operations and all kinds of jobbing work. Easy to operate, will take special bending, punching, or forming dies designed and made to order. Capacity 2" hole in 16 ga. iron, 100 holes per minute or better.



WHITNEY METAL TOOL CO. . 91 Forbes Street, Rockford, Illinois

# Shock Absorbing PILLOW BLOCK At last here's a trouble for TRIANGLE

A Slotted bolt hole in housing facil-itates alignment in mounting.

- Porous bronze bushing feeds lu-bricant from wick to shaft as needed. Easily replaceable.
- Pressed steel spherical housing encloses steel ball (H) insuring perfect alignment through ball and socket action.
- D Threaded opening for oil cup or fitting, leading to oil reservoir.
- E Felt wick stores oil for long periods of operation.
- Thick synthetic rubber cushion supplies a vibration-absorbing element between bearing and housing. Impervious to oil or hardening action.
- G Steel retainer sleeve which holds bushing, cushion and wick in proper relation.
- Pressed steel ball formed around inner assembly holds parts rigidly in position and makes an oil tight seal.

Write for new bulletin containing all details of construction, sizes, etc. Quotations submitted on request and samples sent for tests to interested concerns.

TRIANGLE MFG. CO., 380 DIVISION ST., OSHKOSH, WIS.

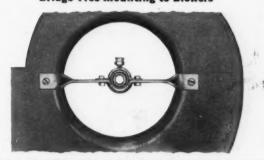
are important considerations.

Cut-away view at the left illustrates how unique engineering has created a design outstandingly different from the conventional.

Besides the obvious advantages of this rigid, CUSHIONED, BALL AND SOCKET BEARING, its compact air-streamed design is of real importance in blower service. It presents the very minimum of air restriction!

Another Triangle innovation is the Bridge Tree Mounting illustrated below. Again we have a minimum obstruction to air flow with maximum simplicity and strength.

### **Bridge Tree Mounting to Blowers**





# Quickwork Stamping Trimmers Give Both Speed and Accuracy

Where speed is a necessity, where accuracy counts, where the job is unusually tough—that's where you'll find QUICKWORK Stamping Trimmers and Forming Machines operating at the greatest profit.

For Quickwork Stamping Trimmers, because of their exclusive design, provide you—in a single machine—with an economical method of trimming, beading, flanging and forming both large and small stampings. With Quickwork you secure production at a speed comparable to that of a press—yet with the smooth, clean cutting action of a rotary shear. Expensive presses and dies are often eliminated.



This Quickwork Stamping
Trimmer and
Forming Machine
can be equipped
with electric eye
control to stop
and unclamp
stamping at completion of cut.
Cutting speeds
range from 10 to
60 feet a minute.

• Quickwork hand lever controlled table type machine trimming sink castings. An economical machine for varied production—in some instances can both cut and flange stamping at a single operation.



• Shipment of many standard Quickwork Models is possible from stock—subject to prior sale. Write, wire or phone Quickwork-Whiting Division of Whiting Corporation, Harvey, Illinois, for complete information and engineering details.

WHITING CORPORATION
HARVEY, ILLINOIS

# QUICKWORK

Rotary Shears · Circle Shears · Seamers · Beaders · Power Bumping
Hammers · Flangers · Stamping Trimming and Forming Machines

Manufactured by

Quickwork-Whiting Division of Whiting Corporation, Harvey, Illinois

### Kruckman's Washington Letter

(Continued from page 84)

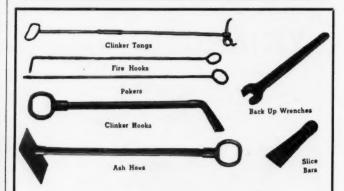
expenses have a sympathetic tendency to rise with the defense expenses. Our usual 1,000,000 civil employees have increased almost to 2,000,000. Naturally, the increase in defense activities forces expansion in regular activities.

In preliminary discussion Mr. Roosevelt declared he would hold down regular expenditures so that the deficit would not exceed \$500,000,000 over the \$7,000,000,000 revenue collected from the usual taxes. He proposed to go before Congress with a regular budget for \$7,500,000,000; and Congress was to be asked to enact a law earmarking all tax collections from the usual sources, by the usual methods, to apply on regular expenses. This was the approach to balancing at least one budget. The defense budget is to be presented later, and with this budget is to be presented a plan to collect special taxes or expanded taxes, the extraordinary taxes to be amortized annually for a period of from 10 to 20 years to pay off the defense expenditures.

### National Income to Be 93 Billion in 1941

The Government experts have variable opinions about the effect of defense spending on national income. A few believe national income pick-up will not be swift. Most of them proclaim that national income will increase 1/3 during this 1941 year, which would make the gross somewhere in the neighborhood of \$93,000,000,000. Others predict \$125,000,000,00 for 1942; and thus upward.

Please bear in mind I am reporting what I am told, not what I know or believe. I have neither knowledge nor hopes. Like many others I am waiting to see what will happen here and elsewhere in the world. Meanwhile, however, Mr. Roosevelt and his friends feel confident that this soaring national income will enable the people



# FIRE-FIXER

Furnace Tools

A complete line for both stoker-fired and hand-fired furnaces and boilers.

Sturdily constructed Fire-Fixer tools are designed to meet all practical service requirements and are efficient and easy to use.

All tools are of cast alloy steel, fitted with standard pipe couplings. They can be furnished complete with handles, or tool ends only.

Ask your jobber for catalog and prices or write direct to:

FARRELL-CHEEK STEEL CO. SANDUSKY, OHIO

not only to pay the regular expenses of ordinary Government, but will enable them to pay defense taxes over the period of ten or twenty years.

And these taxes are not to be the pleasant, or relatively pleasant, excises we have known in our lifetime. Congress will be asked to legalize taxation of all Federal, State, and local public bonds and securities. This is expected to add \$500,000,000 to the Federal revenue. Another law will be asked to raise the national debt limit from its present ceiling of \$45,000,000,000 to \$65,000,000,-000 or more. Congress also will be asked to authorize the sale of defense bonds in denominations as low as \$5, and defense stamps for 25c. The present base of \$800 per annum for single persons as taxable income is to be reduced, and the base of \$2,000 for married people will

probably go down to \$1,500 or even lower.

the

ees

in-

ılar

he

ficit

000

l to

00,ear-

the was

this

xes ort-

pay

oout

few

fost

1/3

me-

hers

told,

edge vhat

dent

ople

١d٠

ed

are

ard

ith

ite

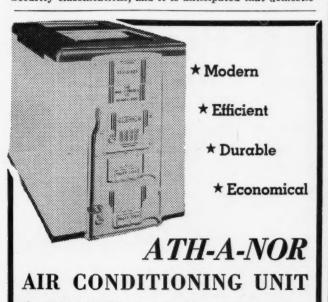
KY.

1941

The nuisance taxes unquestionably will be increased and expanded; more things will be bracketed as luxuries. Our officials have closely studied the British and Canadian methods of increasing tax collections. The British people have an annual income of 25 billion dollars. Their war and government costs them four-fifths of this sum annu-The taxpayer pays 25% on his first \$750 income and thereafter 42.5% the base income tax rate. When his income goes above \$10,000 he pays, in addition, 10% surtax on the first \$2,500 and so on until he pays an additional surtax of 47.5% on all income over \$100,000. In addition, business pays 5% Defense tax and an excess profits tax that confiscates all net earnings above standard profits. The consumer pays 12% on the retail price of clothes, household equipment, etc. And there are still other taxes. Our officials have been particularly interested in the Canadian tax on autos which runs between 40% and 50% on automobiles that sell for \$900, and from 60% to 70% on cars that sell for \$1,200.

Somewhere between 2,000,000 and 3,000,000 persons

were added to the Social Security rolls recently. is more ready cash in further expansion of the Social Security classifications, and it is anticipated that domestic



The ATH-A-NOR Deluxe is designed to meet the ever increasing demand for a modern, efficient, durable and economical air conditioning unit. The new full height Front is pleasing in appearance as well as modern in design to enable you to sell the Home-owners who have new or recently modernized basements.

The ATH-A-NOR line of furnaces has a model to meet every price and every purpose. Available for coal, oil or gas firing, the versatility of these units make them standouts in the field.

We suggest you drop us a line today for further information.

THE MAY-FIEBEGER COMPANY NEWARK OHIO



Order Adams Dampers for proven performance. Manufactured by

Quality

# THE ADAMS COMPANY

ESTABLISHED 1883

DUBUQUE, IOWA, U. S. A.

# CENTRAL PULLEYS

# ★ DEPENDABLE ★ ECONOMICAL ★ EFFICIENT

The efficiency and economy of any air conditioning, stokers or ventilating installation depends in a large measure on the pulleys installed.



Central Pulleys are precision made of the finest materials obtainable and can be counted on to perform well beyond the life of the average pulley. Stokers, blowers, fans, air conditioning units, ventilators and refrigerators equipped with

Central Pulleys will give long life performance.



Make sure your equipment is installed with Central Pulleys. They're your assurance of top-notch perform-

ance all the way . . . over 20 years of experience goes into their making.

Literature is available on the complete line. Write today for quotations on your requirements.

# WRITE FOR CATALOG



workers and farm workers and other classes will be added. They are talking here about 10,000,000 more oldage beneficiaries, 5,000,000 more unemployment listings, 2,500,000 domestic servants, 4,000,000 farm workers, and 3,500,000 State, county, city and other nonprofit unit workers.

### Raise Rates on "Large" Incomes

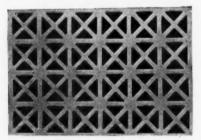
A bill is before Congress placing a tax of \$1 on every billboard in the United States and classifying all expenditures for advertising of any kind as net income to be taxed as net income when advertising expenditures are in excess of \$100,000. There is every likelihood that corporations which now are obliged to pay 50% of their excess-profits as taxes will be required to pay as high as 90%. The whole tendency of tax-thought here is to soak those in the higher brackets and to leave in peace the business men down lower, at any rate so far as direct taxation is concerned.

Surtaxes on income unquestionably will be raised. Income tax, in all brackets, undoubtedly will be raised from the present 4% to 6% or 8%. It is generaly understood that the thought is to raise every possible cent by direct taxes upon those who have surplus income and who buy anything that might be classified as luxuries, before the sales tax is imposed. Mr. Roosevelt is opposed to the sales tax, now. But it is anticipated he will not be opposed to it after surplus and luxuries have been soaked.

### More Essentials to Be Taxed as Luxuries

It will be very wise to keep an eye upon the luxury bracket. There already is a wide divergence of opinion about the things and services that might be defined as luxuries. Some people in the Government apparently think that during the duration of the defense period anything that is not essential should be regarded as a luxury. Obviously that will strike more widely and more deeply than we might anticipate. It might make us walk more, eat plainer foods, wear simpler clothes, have simpler entertainment, live in less elaborate homes, and utilize fewer

# ERFORATED



Light Steel Sheets for radiator enclosures, metal furniture cabinets, radio speakers, etc. We stock sheets of various thicknesses and dimensions in a variety of designs.

### INDUSTRIAL PERFORATIONS

All sizes and shapes of holes in any metal. Your inquiries will receive prompt attention.

Harrington & King

5649 Fillmore St., Chicago, III. New York Office, 114 Liberty St.

mechanical stokers, fewer refrigerators, and less of the equipment and appliances we instinctively now deem as indispensable.

These are the sacrifices we may have to make to help pay for Britain's survival, for the survival of Greece and for the other funds we are pouring into China, Spain, Cuba, Mexico, Peru, Argentina, Uruguay, Brazil, Paraguay, Ecuador, Chile, into other Latin-American countries, by the hundreds of millions, as well as into our defense budgets.

If there is no violent departure from the expected, as the result of the British pressure, no definite decision about the future operation of the tax system and the expanded tax demands will be made until after March 15. On this date the Treasury expects to be able to discern how the new tax law works and how much it may be expected to bring in. The law is so muggy and so confused that even the Treasury experts, who wrote it, do not know the answers. They have not yet even issued the regulations to govern the collection of the bewildering excess-profits tax, although the law goes into effect January 1st.

### Everyone Is Budgeting

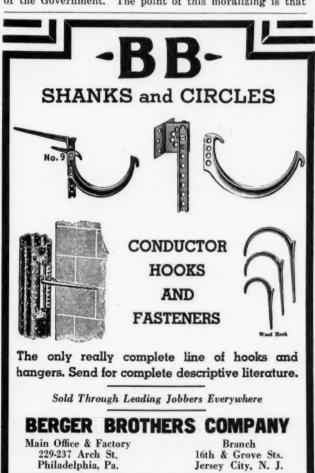
In the meantime the House and the Senate Committees are working together to formulate roughly some sort of overall budget limit and the Appropriations Committees will, if possible, try to fit the various allocations to the different agencies of Government, within the overall budget. It is not expected the plan will work clearly and inclusively. Blunders, bumbling and apparent clumsiness is the price we pay for the thing we call Liberty. Most of us unquestionably hold as an unshakable article of ardent faith that it is better to have this stumbling process of political machinery and Liberty, than the efficiency and smooth operation of the Governmental machines of regimented and despot-ridden nations. In this country, with all its uncertainties, Government is still for the service of the people, not the people for the service of the Government. The point of this moralizing is that

s y y r

etal

ock

ries







C and S Series Gravity. Cast iron and steel. Conco Furnaces are designed RIGHT and offer fine quality at a moderate price.

CS Series Hand Fired Forced Air. For those wanting Conditioned Air Heating with or without stoker or burner.



Oil-Fired Packaged Unit. A full range of sizes. Designed and priced to meet the big volume field.



Conco builds a complete Gas-Fired line . . . Conditioners, Gravity Furnaces, Floor and Wall Heaters.



Magic Spray Burner—Incorporating a new principle to produce a highly efficient flame resulting in surprisingly low operating costs.



CONCO—a LEADER in the stoker industry. A full range of sizes in domestic and commercial models.

The CONCO "Automatic Packaged Heat" line for 1941 has everything—IS everything you want. Make 1941 YOUR year with CONCO.

### SEND THIS COUPON FOR ALL THE FACTS ON CONCO

CONCO CORPORATION - MENDOTA, ILLINOIS

Write for complete facts on Conco's greater profit line for 1941.

NAME .....

EQUIPMENT NOW BEING HANDLED ...

Conco Corporation Mendota, Illinois

ADDRESS .....

# Action Proved! XXth CENTURY'S ALL CAST ZEPH-AIR GAS FURNACE

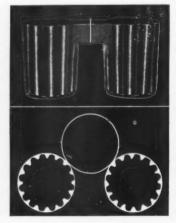


THAT'S a real sales point. . . . "Action Proved!" To you it means that the XXth Century ZEPH-AIR Gas Furnace will allow you to make the installations and forget them! No service calls to eat into your profits, no irate customers complaining about poor performance . . . and a chance to improve your reputation to the point where customer recommendation will be an important and integral part of your sales campaigns.

To the homeowner "Action Proved" means years and years of comfortable, healthful heat . . . completely automatic! No fuss with ashes, no back-breaking labor with the coal scoop and a clean, healthful house the year 'round.

It won't take much effort to sell your prospects on the ZEPH-AIR . . . just tell them about the Double Gear shaped radiator which trebles the active heating surface . . . the compact streamlined design . . . and the all-cast construction for strength and durability.

We'll help, too! Write us today for free literature and sales assistance.



STRIKING ECONOMY WITH A NEW GEAR-SHAPED RADIATOR

Illustration shows Double Gear shaped radiator for greater efficiency. This shape gives far greater heating surface with a minimum restriction to the even flow of heat, at the same time providing maximum vertical heat surface. Note comparison of Double Gear shaped radiator with standard radiator of the same diameter, The Double Gear shaped radiator shows over three times the area for providing heat.

Drop us a postcard Today!

XXth CENTURY HEATING & VENTILATING CO.

you, whereever you are, may write your representatives in Congress and tell them if you do not like these tax ideas and they will seriously and carefully consider what you say. You may even write to Mr. Roosevelt and he will follow the opinion of the majority.

The whole tax problem of the nation is in the hands of a group consisting of Assistant Secretary of Treasury John Sullivan, Budget Director Harold Smith, Secretary of Treasury Morgenthau, Secretary of Commerce Jesse Jones, Senators Pat Harrison, Walter George, Alvin Barkley, Robert LaFollette, Representatives Robert Doughton, Jere Cooper, John W. McCormack, Clifton Woodrum, and Alvin Treadway.

Woodrum, and Alvin Treadway.

They have already decided that any new tax law will not be retroactive; and they have strongly intimated that the 24% tax on corporations which at present includes the regular income tax, the 10% defense tax, and the excess-profits tax on income above \$25,000 net profits, may be increased to 30%. It should be remembered, however, that circumstances now brewing may easily cause a shift in this conclusion. If you watch the situation and if you let them know what you think and why you think it, it will offset pressures from other directions. Remember, your opinion is fully as important to the people in Washington as are the opinions of people across the oceans, or in other brackets of the national economy. If you do not make your opinion felt it is your own fault. The main reason the other fellow manages to make his ideas register is because he registers them noisily.

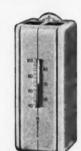
### No One Understands Excess Profits Law

As has been suggested earlier in this article the excessprofits tax law which becomes effective January 1st has become one of the most unhappy incidents in our tax history. After a long study, the Committee on Federal Finance of the U. S. Chamber of Commerce, composed of 14 of the foremost fiscal and tax experts of the nation, prepared a report, to be published in January. It contains these words:

# RUGGED CONSTRUCTION SIMPLE OPERATION

Those are the features that assure the trouble-free operation and long life of

this regulator. For you, this means freedom from service calls and a friendly feeling on the part of your customers . . . when you install the



# **MASTER**

### **HEAT REGULATOR TYPE A-23**

This positive, snap action regulator operates on a differential of only  $\frac{1}{2}$  degree. Accurate, dependable, low cost, it will outlast the heating plant itself. Operates quietly, surely, and safely—to the complete satisfaction of the most exacting user. Write us today for bulletin giving complete information on the Master line.

Makers of Dependable Regulators for 25 Years

## WHITE MFG. CO.

2368 University Ave.

ST. PAUL, MINN.

"The Act unquestionably is the most complicated, technical, and involved tax statute ever enacted by the Con-The line drawn between 'normal' and 'excess' profits is, in many respects, arbitrary. It prescribes computations which are impossible. In many of its provisions, ordinary standards of reason, justice, equity, and common sense have been disregarded."

The report recognizes the desire of Congress to tax only true profits and ascribes the mess to the extraordinary pressure of the demand for additional revenue. The point is dramatically pertinent because that pressure has increased and with the need for means to finance British operations, will increase tremendously. As the law is now drafted, the report expresses doubt "whether any expert anywhere really can interpret the law so that its meaning is clear and understandable." It has become quite clear that the Treasury people would like to operate the law permanently on the sole basis of capital invested. Canada bases the excess-profits tax upon average earnings over a period of prior years. It has found this formula to be satisfactory to the business men and to the Government. The U.S. Chamber of Commerce urges that the alternative option be retained in the law which now enables the taxpayer to base his excess profits upon net income of prior years as well as upon invested capital.

As the law is written, you may base your net earnings for excess-profits tax computations upon the average earnings for 1936, 1937, 1938 and 1939. If by chance you have two minus years in this series, you are allowed to omit only one, and you are forced to compute your net earnings on two years, one of which may have been artificially high. The injustice is patent. The Committee will try to secure an adjustment. The Committee also asks Congress to legalize the addition of accumulated net earnings and profits to capital. Under the law as written you must make your final selection of the method by which you wish to compute your tax basis when you file your first return. The Committee demands that this choice be left open from year to year. The Act requires

ıs

X

d-

n-

ne

941

. . . . . if you do, you'll save yourself time and money by ordering it from Capitol's reliable stock. Parts are guaranteed to fit and the quality of Capitol stock has been proven time after time in countless installations.

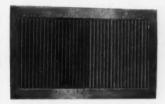
Write us today for free catalog. You'll get it at once!

# TOL FURNACE AND OVE REPAIR CO.

443 E. Washington St., Indianapolis, Ind.

# real efficiency and economy

For any installation, new or old, you'll find the complete Rock Island line at your service. Any type of register in any quantity . . . and with the famous built-in Rock Island quality. Standard with smart, responsible, heating, ventilating and air conditioning contractors for many years. Write Today for Literature.



#### AIR-VANE REGIS-TERS, FACES AND GRILLES

Forced Circulation Registers. Adjustable flow right or left. Also horizontal or vertical in wall or base types, all sizes.



#### REGISTER

Complete with Double Metal Head. Pipes sizes 8 in. to 14 in.





### FORCED-AIR ONE-PIECE REGISTER

Stack Head Sizes from 10x4 to 30x8. All attractive designs with large capacities, moderately priced.

FORCED AIR BASEBOARD RE-TURN AIR OR GRILLE FACE

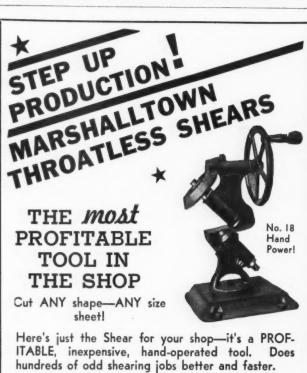




Write Today for Literature

ROCK ISLAND REGISTER CO.





Quickly CUTS ANY SHAPE in 18 gauge or lighter

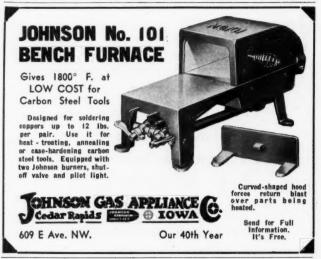
Get special Shear Bulletin today. Gives details, of sizes from 18 gauge to one-half inch capacity.

daily computations of equity invested capital, of borrowed invested capital, of the adjusted basis of each asset and involves daily computation of values of inventories. "These computations are impossible. Furthermore, they are unnecessary," according to the report.

As the law is writen those with normal tax net incomes of less than \$25,000 may carry over losses from a minus year to equalize profits in a plus year. For instance, you have a tax exemption of \$6,000. But you actually earn only \$4,000 net. In this case you carry over \$2,000 to the next year when your exemption would be \$8,000. The Committee urges that a similar carry-over privilege be extended to those who have net incomes over \$25,000. It also points out that a person who draws \$5,000 each from 5 different companies is taxed heavily, while the same person who draws \$25,000 net from a small corporation has only negligible tax burdens. The report finally urges: "The rates of tax should be imposed on the percentage of excess profits over normal profits, as proposed in the bill that passed the Senate, rather than upon the dollar amounts of excess profits as in the law finally enacted."

#### How You Figure Is Your Choice

Under the excess profits law as it now stands corporations with a net taxable income up to \$25,000 pay the Federal Government a gross of 22.1%, which includes the present 4.4% normal income tax, the 10% special defense tax and excess-profits tax. Those with net earnings over \$25,000 start by paying \$3,775; then 35% of the net income over \$25,000. For instance, suppose the net taxable income totals \$40,000. The taxpayer pays \$3,775, plus \$5,250 which is \$35% of \$15,000; the total tax being \$9,025, or \$22.56%. He uses this method of computation until his income, defense and excess profits taxes are equal to 24% of his net earnings. The equation of \$3,775 plus 35% is most useful until the net taxable earnings reach \$20,000. Above this it is most practicable for the taxpayer to compute the taxes by using the 24% equation







SIM-TROL Simplex Automatic Draft Control

Balanced draft—proper relationship between overfire and natural draft—helps you obtain greater fuel savings, reduced stack losses and increased customer satisfaction on all your furnace jobs. The type "i?" Sim.Tro! illustrated will hold the draft constant to within 1/100 of an inch of the desired point, under all atmospheric conditions. Low price, case of installation and several outlines. Item to complete your line. Please write for literature.

SIMPLEX MANUFACTURING COMPANY 198-206 NORTH MAIN STREET, FOND DU LAC, WISCONSIN

920 E. Nevada Street

material.

Marshalltown, Iowa

in connection with any sum above \$45,000 of all net earnings.

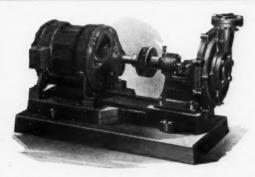
The U. S. Chamber of Commerce Committee report emphasizes that no one can yet determine what revenues may be derived from the operation of this abstruse law,

or what penalties are inherent in the law.

The Committee urges upon Congress immediate enactment of amendments which will simplify the law and remove the jeopardies and inequities to which the average business man is exposed. It urges the enactment of the amendments before the Bureau of Internal Revenue begins to function under the law on March 15. It stresses particularly that no expert today can understand the Act and that the Act's interpretation is wholly within the sphere of the Bureau of Internal Revenue. This being true, if the average business man wishes to combat the law as written, he must hire very expensive experts, if they are available; and then he is confronted with the problem of the expense of such service.

The law was enacted in very great haste, without thoughtful consideration of its provisions; and there is a sentiment in Congress that the parts which are obviously senseless, or troublesome, or inequitable, should be voided by amendments, or should be corrected or adjusted. Congress will act if it feels the business community wants action. The U. S. Chamber of Commerce, in Washington, D. C., will send you any information you may want.

You may also write Senator James Murray, chairman of the Small Business Committee, which begins hearings in January on all problems that bother the average business man. It will particularly consider these tax problems and it will try to find a way of eliminating most of the endless reports required by Government from the average business man. The committee is interested in placing the average business man in training for defense orders and particularly to help the firm with \$100,000 capital to make more profits. Senator Murray feels the so-called small business is basic in preserving a healthy, democratic nation.



These single suction base mounted pumps are for use where it is not practical to use a close coupled pump. They may be coupled to a standard motor or engine or driven through a flat or V-belt drive.



The type "R",

ELECTROPUMP

specially designed for use as a spray pump, for booster service, hot or cold water circulating. Immediate shipment on many sizes. Bulletin R-5500.

# WEIL PUMP COMPANY

FIRE-HOUSE CIRCULATING



BOILER FEED CONDENSATION VACUUM

Wells and Superior Sts., Chicago, Illinois

# OF ALLEN Turbine Ventilators for 3 Important Jobs!

1. CONI-VANE. The famous "Free Air" Allen Ventilator which gives cost-free powerful suction, and is the standard installation for most+ ventilating jobs.

2. ELECTRO-WIND. Air plus power. The same Coni-Vane ventilator, with auxiliary electric power available to double the exhaust at a trip of the switch.

3. TYPE "C." The vane-less Allen, especially designed for chimney jobs or any ventilation project where lowest cost is demanded.



ILLUSTRATING CONI-VANES

Our engineering department will assist you if desired. Let us send the latest literature for your files, on these 3 types of Turbine ventilators, and also the many other types of Allen Ventilating Equipment for varied industrial uses.

# The ALLEN Corporation

9752 ERWIN AVENUE

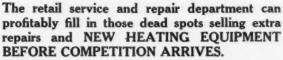
DETROIT, MICH.

# BEGIN THIS YEAR RIGHT

with the GRAND RAPIDS FURNACE CLEANER

The Grand Rapids Furnace Cleaner gives you a profit from the cleaning and provides the





The GRAND RAPIDS FURNACE CLEANER is truly a ONE-MAN DELUXE VACUUM CLEANER. It represents the ultimate in mechanical construction. It is the most POWER-FUL—finest operating machine with professional appearance which puts you over with your customer. Sturdily built to last a long time.

Free Trial—Convenient Terms

DOYLE VACUUM CLEANER CO. 227 STEVENS ST., S. W. GRAND RAPIDS, MICH.

# MILL EXHAUSTERS

- I. Designed and built by the Pioneer exhauster manufacturer.
- 2. Result of over 80 years of air engineering experience.
- 3. High efficiency assures low power consumption.
- 4. Sturdy construction assures dependable service. Write for Catalog No. 430

B. F. STURTEVANT CO. Hyde Park, Boston, Mass. Branches in Principal Cities



# LITTLE BLACKSMITH No. 39

# SHEET METAL NOTCHER

Capacity 5"x5" 90° Notch-20 Gauge

Saves time and hand work, produces work which will fit accurately.

Write for Catalogue No. 40 on our Punches, Shears and Deep Throat Presses.

J. F. KIDDER MFG. CO., Inc. 400 Colchester Ave. Burlington, Vermont

## KLENK'S Double Action Aviation Snips



- 1. Detachable rubber grips over handle of chrome molybde
- Detachable rubber grips over handle of chrome molybus num steel
  Adjustable lock
  Special hardened alloy steel. Tensile strength \$500 lb.
  A. & H. Standard bolts
  Curved jaws for cutting ends of tubing to .085 in. wall
  VALUE—LOW COST—A trial will convince you. Maboth right and left hand—straight or curves—Easy
  k—Order today.

KARL KLENK'S AVIATION SNIPS
FIFTH ST. WILMINGTON, DELAWARE

107 E. FIFTH ST.



# Have You the Ward Catalog-and Latest **Net Price Sheet?**

Devoted entirely to machines, tools and supplies for fabricating sheet metals exclusively. If not write us today.

# WARD MACHINERY CO.

564 W. Washington Blvd., Chicago, Illinois

# Managing a 1,000 Furnace a Year Volume

(Continued from page 174)

has several assignments for the same day, a "priority order" is given them, but an effort is made to keep the number down to no more than two. This program is made up each evening after the crews have come in from their work.

Assignments are determined by several factors: First, the notification by a supervisor that a job is ready; next, from the Trucking Department, a report that the material has been shipped or is ready; and last of all, the report from the crews of the amount of work they have accomplished and what remains to be done on their current assignments. When all these aspects have been considered, the Master Sheet is made up for the following day. A separate assignment sheet or sheets is prepared for each crew (see Fig. 4) and these sheets together with any sketches, notes, or blue prints, are given to the crew leader in the morning. Each leader turns his sheets back in to the manager, properly filled out, each evening.

An important crew is the "pickup crew" which puts on registers, runs extra lines to recreation rooms and maids' rooms, finishes up jobs where an hour or two is needed.

Assignments of the "Pick-up Crews" are managed in much the same way, but as they usually have a large number of stops to make, an ordinary sheet of lined paper is used to list their work. The order in which they are to proceed is carefully determined in an effort to cut down on "back-tracking" and a carbon copy of this sheet is kept in the office. Here again the crew leader goes over his work with the manager each night and note is made of jobs finished.

### Cost Accounting Automatically Controlled

The collection of "Moneys due" is an important phase of General Management, and as such is handled by the Credit Department. However, notice must be sent to them by the Installation Manager when various stages of a job are finished, so that proper billing can be made. This is done by means of the Master Assignment Sheet (Fig. 3). As a "Billing Phase" of a job is finished, such as wall stacking or basement finished, it is noted on the sheet in colored pencil and sent each day to the "Wiring and Unit Installation Department" which then passes on the billing information to the Credit Department. Notice is thus given for wiring and billing at the same time. Entry is also made on the master card (Fig. 1) for a permanent record. As a further

# Libert Hi-Speed Shearing

Saves Time—Labor—Money

Sheet Metal Shops! You'll enjoy these advantages with

### LIBERT Hi-Speed SHEARS

- Increase Production—through faster cutting, with less effort.
- Save Finishing Time—edges are always smooth, clean, flat, requiring no further finishing.











of shapes without ad-justment. Cuts rings or circles, flat or formed pieces, plain or intricate shapes, in sheet metal, stainless steel, expanded metals, up to and including 10 gauge mild steel sheet.

chine cuts great variety

For more profitable Shearing, see your Libert Distributor—or write for latest bulletins.

LIBERT MACHINE COMPANY GREEN BAY WISCONSIN

MANUFACTURERS OF SHEARS SINCE 1915

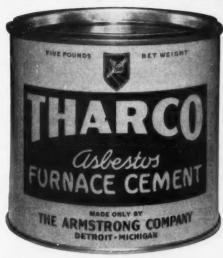
# 7 PT Hi-Speed

REPAIR PARTS

Central can supply you in a hurry with any part you need to fit those fall and winter repair jobs. Central parts make jobs easier and easier jobs mean more profits.

TOVE REPAIR CO. St. Louis, Mo.

# THE STANDARD FOR 30 YEARS!



Leading manufacturers and furnace repair men have found Tharco "tops" in every way. Why not try it? On sale at leading jobbers.

MANUFACTURED ONLY BY

THE ARMSTRONG COMPANY DETROIT DALLAS CHICAGO



AND the plus values are the ones which pay back, back to the owner, the most real money. Here is the machine designed and built for the tough job it does. The Super gives a long, long life of hard service, upkeep cost is almost nothing, dependable, no costly breakdowns, no troublesome service problems. Investment value and operating value, at the highest point in the industry. Compare the Super. Test it. We make that easy for you by our free trial for five days after arrival at your place. Write for this free offer. The National Super Service Company, 1944 N. 13th Street, Toledo, Ohio.

The National Super Service Co. 1944 N. 13th St. Toledo, Ohio Any range (5 F.P.M. to 24,000 F.P.M. TAKES JUST A MOMENT TO CHECK AIR VELOCITIES WITH THE



ILLINOIS TESTING LABORATORIES, INC.
419 N. La Sallo Stroet Chicago, Illinois

You can save time and know whether your heating and air conditioning jobs are right when you use the "ALNOR" Velometer. Without timing or complicated mathematical calculations the Velometer gives direct, accurate, instantaneous air velocity readings. Many users report that with the Velometer they can check and balance a system in one tent the time formerly required, and the Velometer gives them a picture of air distribution that no other instrument can. Write for details.

check to make certain that all Wall Stack billing is turned in, each disbursement sheet is checked against the master card before sending the sheet on to the Cost Department. The Master Assignment sheets are returned to the Installation Department to be filed as a permanent record.

It is important from the sales angle to have an accurate cost account kept on all jobs. A study of these figures can enable them to keep their selling price down to meet competition. The actual records are compiled in a Cost Department, but it is necessary for the Installation Manager to see that this department gets the correct amounts of material and labor put out on a job. To do this a record of all material is kept on a standard form by the Shipping Clerk who weighs all material disbursed other than so called "stock fittings" (these fittings have had test cost runs made and are priced out at the same cost each time). All these records are passed through the Manager's desk and thence to the Cost Department.

Getting the materials needed to the jobs when needed is the work of the Trucking or Shipping Department which consists of four drivers and one shipping clerk. The drivers must know their city and be relied on to take care of new material and thoroughly clean up all material left over after a job has been finished. A good cleanup job not only recovers material which can be used again, but also is very pleasing to the builder who likes his jobs kept clean. The shipping clerk is responsible for the assignments of the drivers and for their discipline. He must also enter all disbursements and supervise the loading of materials. A report from this clerk must be made to the Installation Manager each afternoon showing all materials delivered during the day and all materials in the process of fabrication in the shop with an estimated time of delivery. This report is necessary to the Manager in making out his program for the following day.

This department organization has been developed over a period of four or five years from the stage where all actual duct installation was subcontracted with local sheet metal men to the present self-contained unit. At the present time the Columbia Specialty Company includes in its services to the community a complete Winter Air Conditioning Installation, a twenty-four hour Service Department, a twenty-four hour Fuel Oil Distribution, and a Retail Oil Burner Unit Service. Each phase of this work is carried on by specialized departments all coordinated under the supervision of Mr. Joseph Richards, Sr., who has directed the company from the days when it had one service man and no air conditioning jobs to its present volume of 1,000 installations a year.

# **PORTABLE SHEARS**

**ALL-ALLOY** 



ALL-ALLOY No. 2 cuts up to 1/4" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

**FULLY GUARANTEED** 

BREMIL MFG. CO. Erie, Pa.



Furnace and Boiler Vacuum Cleaner Not only does it excel in furnace and

boiler cleaning, but it puts you directly in touch with the furnace and repair needs of your customer. Not a converted household cleaner, but DE-SIGNED FOR THE JOB. Complete set of necessary attachments.

BREUER ELECTRIC MFG. CO. 5082 N. Ravenswood Ave. Chicago, Illinois



Ask for FREE SALES PLAN and

# SHEET METAL MACHINERY

**SINCE 1880** 

The New Atlas Lock Opening Machine is here. All sizes of Lockformer Pittsburgh Rolling Machines. Large stocks in New York Warehouse of Sheet Metal Tools and Machines, Brakes, Square Shears, Auer Registers and Grilles, Metal Screws and Dial Regulators.

Try us for Quick Delivery. Skylight Gearing at low prices.

SPOT & ARC WELDERS IN STOCK

117 Mercer Street H. WEISS & CO. New York, N. Y.
Telephones: Canal 6-1331, Canal 6-7676

## "I Must Say, They Give Me A-No.1 Cooperation and Service"

"The Williamson Heater Company:

n

y

r

r

et

0.

a

S

k

IS

h

ıe

n 12 nd

ir

al

er ob ed er

rk

rs all

teto

ng

la-

op

is

ro-

el-

the

ub-

es-

the rv-

Air

our

Oil

rv-

by

the

has

had

obs

s a

1941

"As an advertisement writer, I am a very poor hand, so would rather have you write it, but here goes!

"All Williamson Furnaces I have handled I have had no complaint to make, as the furnaces come out nice and clean, and I have no trouble erecting them.

"You have such men as Mr. Goodall, Mr. Breutner, and Chicago Furnace Supply Company handling your Chicago warehouse—I must say they give me A-No. I cooperation and service."

Signed-X Y Z, . . . Illinois.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service



This is our Fifty-first year

## YOUR BLOWER REQUIREMENTS

available at

#### **Schwitzer-Cummins Company**

BLOWERS FOR EVERY PURPOSE

HY-DUTY Blowers, 9 ¾" to 25". Top and Bottom Horizontal, and Top and Bottom Vertical Discharge. Top and Bottom Motor Mounting. Dual Units also available.





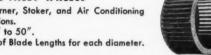
#### · CENTER DISC WHEEL

Double Inlet, Double Width. Reinforced Center Disc. Designed for Modern Air Conditioning and Heating Applications. Sizes, 4½" to 50".

#### . SINGLE INLET WHEELS

For Oil Burner, Stoker, and Air Conditioning Applications. Sizes, 4 ½" to 50".

Variety of Blade Lengths for each diameter.



#### ENGINEERING DATA

Write for Catalogues showing complete Performance Data. Experienced Engineering Department available to help solve your Air Handling Problems.

BLOWER DIVISION SCHWITZER-CUMMINS COMPANY 125 FAN STREET INDIANAPOLIS, U. S. A.





- Brings in Fresh, Clean, Filtered Air . . . 475 Cubic Feet Per Minute.
- Exhausts Stale, Stuffy Room Air . . . 110 Cubic Feet Per Minute.
- Recirculates Room Air . . . 185 Cubic Feet Per Minute.

Every office, home, apartment | Philo Radio & Television Corporation is a prospect . . . large volume, steady profits! Easy-to-handle package merchandise! No Saturation! No Trade-in Allowances! Installation is quick, easy . . . a thirty-minute oneman job. Get ready to cash-in! Mail the coupon today for full information.

· Shuts out Noise, Dirt, Dust.

\* Price slightly higher Denver and West

Dept. No. Please send franchise pr Room Vent	547, Philadelphia, Pa. me full details of your deale oposition on the new Philo: ilator, with Discounts, Specia Credit Terms and literature.
Name	
Street	
County	
City	State

## WHAT ARE YOUR PLANS for 1941 PROFITS? START EARNING THEM NOW!!



Are you equipped with a furnace cleaner? If so, how good is it?

This business pays dividends only when your furnace cleaner give you

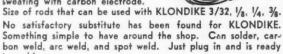
#### POWER PRODUCTION SERVICE

Investigate the KENT DOUBLE SUC-TION for greater profit possibilities in 1941. NOW!

THE KENT COMPANY, Inc. 167 Canal St. Rome, N. Y.

## KLONDIKE 110-220 VOLT WELDER

Ideal Equipment for Air Conditioning and all sheet metal work. All heavy metal steel, black iron, cast iron and boiler sections. Most suitable for copper tube sweating with carbon electrode.



Anybody who has the experience soldering knows metal, there fore they know the kind of a metal weld rod to use.

GUARANTEED
Send for literature today! RALPH FERN 2430 Boulevard Ave. SCRANTON, PA.

Made from a formula especially compounded for soldering Stainless Steel. Produces clean, strong joints. Metals fuse perfectly without discoloration. No special equipment needed. Recommended by stainless steel fabricators.

#### OTHER RUBY PRODUCTS

- ACID CORE SOLDER
  - SOLDERING PASTE
  - SOLDERING FLUX

RUBY CHEMICAL CO. McDowell St., Columbus, O.



## Effects of Insulation and Weatherstripping on Air Filtration

(Continued from page 103)

in efficiency from 50 per cent to 100 per cent decreases the ratio only from 32 per cent to 18 percent. The first reduction is 63 percentage units while the second reduction is only 14 percentage units. Similar analyses and curves lead to comparable conclusions in the other cases.

#### Summary

In this article a typical residence equipped with a forced air heating system has been analyzed from the standpoint of the effect on interior dust concentration caused by seasonal variations in the heating requirements and by the application of insulation and weatherstripping. The dust analyses and the equations used in their calculation have been placed on a dust particle count per cubic foot basis, but can be translated quite readily to a weight per cubic foot basis. It has been shown that there are marked seasonal variations in the efficacy of filtering systems in which the periods of operation are dependent upon the heating requirements of the building. It has also been shown that the addition of insulation to a residence increases the dust concentration if the design register temperature remains the same, but has no effect if the number of air changes are kept constant and the register temperature is reduced to compensate for the reduction in heat loss. In either case the application of weatherstripping reduces the dust concentration. The diminishing return of reduction in dust concentration with increasing filtering efficiency has been illustrated and discussed.

## News Briefs -

The Northern Metal & Roofing Co., Green Bay, Wis., is erecting a new office and sheet metal shop adjacent to its present warehouse. The office will be of face brick exterior with a clay tile shingle roof.

## A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heat garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

It uses a positive pressure, rotary type fan.
 Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.

3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!

AMERICAN FOUNDRY & FURNACE COMPANY Illinois Bloomington,



Patented

#### Dingle Bookkeeping

8

e

d

h

d

st

n

n

n

er

te

as

ch

he

SO

a

he

ut

re

re-

at

er-'he

ennas

i, is

rick

1941

(Continued from page 204)

Age Benefits Taxes actually paid by the business. As is stated under Accrued Taxes—Old Age Benefits, employers are required to withhold from the wages of their employees, as paid, one per cent of such wages for the employees' contribution towards his old age pension and to this the employer is required to add an equal amount. This expense account, then, contains the employer's portion of this tax, computed at the close of each month.

167—TAXES, UNEMPLOYMENT COMPENSATION—This account will contain the monthly charge for unemployment taxes, computed, as stated in our discussion of accounts No. 64 and 65, Accrued Taxes, Unemployment Compensation. Both the State and Federal taxes will be contained in this account.

168—TELEPHONE & TELEGRAPH—This account name indicates the class or type of expense to be here charged.

169—TRAVELING EXPENSE—This account may not be necessary, as we have under "Selling Expenses" discussed that account as containing the expense incident to selling. If, however, there is but little selling expense, as such, that account may be eliminated and this one used to contain such traveling expense as is incurred both for selling and for buying.



## MAKE MORE MONEY and do a better

and do a better job Quicker!



The SMITH'S CLEAT
BENDER as a bench tool
. Bending mandrel slotted
to take ANY size pipe up
to 12°. Bender portion
demountable to apply to any
pipe position . Also
makes perfect Drive Cleats.

HERE is a really efficient drive cleating tool that will do your cleat bending quicker, better, and at lower cost, yet it will give you a job that you will be proud of and able to guarantee against defects. Order a Smith Cleat Bender today. You'll make more money and do a better job quicker.

R. E. SMITH

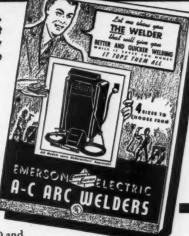
1521 GARDENIPLACE

WAUKEGAN, ILLINOIS

# This FREE CATALOG will help you select the WELDER you need Send for it today

Choose wisely. Find out about all four new models before you decide!

Emerson-Electric, Multiple-Service A-C Arc Welders cost less to buy, less to operate, less to maintain, give longer service. Continuous duty. APPROVED by UNDER-WRITERS'.



Sizes: 75, 150, 200 and 300 Amp. models. Up to 30 welding heats. Take rods up to \(^1/4''\) diameter! Portable, compact, streamlined. Wide variety of uses, from home and garage service to heavy castings and structural steel. Before you buy ask for catalog No. 516.

THE EMERSON ELECTRIC MFG. CO. . ST. LOUIS, MO.

# "NEW FIELDS for Profits in NEW METALS"

- CHROME FINISHED COPPER
- CHROME FINISHED STEEL

Write us regarding your problems of designing and trim on interior and exterior finishes.

APOLLO METAL WORKS
6653 S. Oak Park Chicago, III.



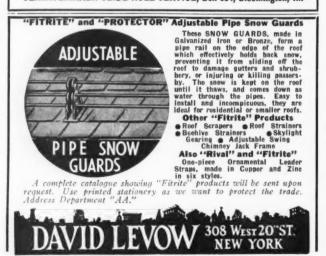
# Figure B. T. U.'s Yourself—Quickly! Easily! with a CLIMATEMAKER SLIDE RULE!

You can easily learn to manipulate the slide rule and quickly get:

- 1. B.T.U. heat loss for each room.
- 2. C.F.M. required, for forced air.
- 3. Pipe area, pipe size and stack size, for forced air.
- Square feet steam radiation, or hot water (for comparison with the warm air).
- Gravity warm air pipe size, and area, for both standard and competitive sizing methods.
   Quit struggling with heat losses—Get a Climatemaker Rule. \$10. each.

Send for information to

CLIMATEMAKER SLIDE RULE SERVICE, Box 904, Bloomington, III.



#### 1940 Broke Most Records

(Continued from page 83)

and 7.1%; farm structures, 4.7% and 4.3%; all other types, 3.4% and 3.9%."

Of more interest are figures showing what products or services the public considered most necessary. These ratios are—"New construction, 3.5% by number of loans and 11.9% of dollar amount: structural additions and alterations, 13.4% and 18.1%; exterior painting, 18.1% and 18.1%; interior finish, 6.4% and 6.2%; roofing, 15% and 8.3%; plumbing, 8.8% and 8.1%; heating, 26.2% and 22.1%; misc. 8.6% and 7.2%.

It would seem, from the above, that repair, remodeling and replacement of existing heating plants on FHA loans constituted a market for well over 50,000 furnaces. If 50,000 furnaces were bought under long term loans, something like 150,000 replacement furnaces must have been bought from private savings or short time loans.

#### Oil Burners

As shown previously, oil burning, winter air conditioning systems increased substantially in 1940, but so did the sale of conversion oil burners. There were sold in 1940 probably 225,000 burners of the home heating sizes excepting distillate burners for room heating or stoves—the greatest sales volume in the 23 years of oil burner sales. Today, reports Oil Burner Institute, more than two million homes are heated by oil.

#### Stokers

Stoker sales, in 1940, also broke all previous records. More than 150,000 stokers of all sizes and types were sold of which 95 per cent were the underfeed type. Of this number, probably 130,000 went into residences and were 60 poundsper-hour capacity or less.

#### Sheet Metal Construction

Architectural sheet metal work in 1940 continued, as formerly, without the benefit of any definite figures on which to base volume calculations. It is known that a very large tonnage of metal was fabricated and installed in new buildings constructed and, of much encouragement to our industry, owners seemingly are now fully aware of the importance of adequate protection against water penetration and accordingly most 1940 buildings were more thoroughly "flashed" than ever before.

Spectacular and ornamental exterior sheet metal work was scattered. Some of the largest sheet metal roofs were completed in 1940 in conjunction with rearmament, but private metal roofing and ornamentation remained a "here-and-there" volume.

Commercial air conditioning employing central equipment and duct distribution increased considerably in dollar volume over 1939; ventilation continued to be an important requirement of all new industrial and commercial construction and a "first-need" in industrial rehabilitation. Incidentally, from reports across the country, hundreds of plants long idle, or partly so, were reconditioned, re-machined for rearmament orders and sub contracts. This created a very substantial market for sheets, fans, motors, and sheet metal fabrication.

all

hat

ost

on.

llar

ns,

and

ng,

eat-

air.

ing

for

aces

ing

een

ans.

air

7 in

ers.

ners

llate

atest

ales.

than

rious

sizes

were

oably

inds-

con-

any

lcula-

ge of

ouild-

nt to

fully

ection

most

shed"

sheet

argest

1 con-

roof-

e-and-

Y, 1941

#### Metal Specialties

Orders for light gauge and heavy plate metal specialties increased tremendously in 1940. Shops equipped and staffed to produce sheet metal specialties doubled and trebled floor space, equipment, mechanic forces and only at the end of the year obtained any satisfactory picture of the extent of the work in prospect. In this connection, it was emphasized many times, in many shops, during 1940 that there is a very decided trend toward items fabricated in sheet metal which up to now have been assembled of castings. Rearmament, also, is calling for hundreds of accessory items (cabinets, casings, enclosures, bases, containers, furniture, etc.) and the flood of orders has only begun.

#### 1941

Business, in all lines, expects 1941 to equal or better 1940. The rearmament program, alone, must continue beyond 1941 if present plans materialize. Production of rearmament items is only now assuming a volume at all in keeping with early predictions and every item at all connected with the rearmament program undoubtedly will continue at full speed production through 1941. Many phases of rearmament are only now taking definite shape. House construction for civilian war workers, for example, still remains mostly a paper volume.

## Camp Custer

(Continued from page 97)

dorsed by all contractors.

As a result of this organized planning, Camp Custer will be completed on or ahead of schedule -one of the few projects to be finished on time. The War Department recognized this excellent performance by promoting Captain Everett C. Hayden — Camp Custer constructing quartermaster-to be Major and a zone constructing quartermaster to be in charge of all construction work in one of the army's nine corps areas.

Owens, Ames and Kimball recognized Sunbeam's role in keeping schedules, in a letter complimenting Sunbeam on its splendid cooperation and upon deliveries of material and completion of heating systems on time or ahead of schedule.

## The "QUALITY" Nail!

## ROOFING NAILS

Look at it!... You can SEE the superiority of this nail! The lead, under Look at it!... You can SEE the superiority of this nail! The lead, under the head and down the shank, plugs the hole around the nail with lead to form a weatherproof seal ... the "bump" triple-locks nail, lead and sheet solidly together... when the nail is driven through sheet metal roofing, the drive screw shank gives greater holding power than any other nail. No loosened roofing, no leakage. Insure QUALITY roofing jobs with Deniston QUALITY Nails. Full details and prices, with samples and demonstrator blocks, FREE.

The DENISTON Co. 4856 SO. WESTERN AVE., CHICAGO

## SPOT WELD

WITH AN

## ACME "Hot Spot" WELDER

Proven utility for over 25 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.

Complete Range of Sizes Lifetime Guarantee!

## ACME ELECTRIC WELDER CO.

5619 Pacific Blvd.

Huntington Park, Calif.

ACME

## Eliminate Condensation Trouble

USE VITROLINER

— the permanent chim-ney lining that totally eliminates chimney de-terioration caused by acid - bearing moisture deposited by all types of fuel. Made of Armco Ingot Iron, Vitreous enameled both inside and out.

Also manufacturers of Condensation Eliminator and Howle Heat Extractor. Write for free condensa-tion folder and price list.



CONDENSATION ENGINEERING CORPORATION 2515 Archer Avenue - - - Chicago, Illinois

## Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?

-Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly hir Conditioning Section of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us \$2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

#### AMERICAN ARTISAN

6 North Michigan Ave.

Chicago, Ill.

## AMÉRICAN ARTISAN ervice Section



## AIR-LIFT for sluggish ducts in forced or gravity systems.

To Install: Remove section of duct and insert AIR-LIFT. Motor is not in path of air. Fan is blower type for positive flow. Available with hu-midity attachments. Write now for literature.

MAUER ENGINEERING 2525 Colfax St., Evanston, III.



HUMIDIFIERS

are priced low enough for every home owner to af-ford one for every radiator or register in the home. We have an at-tractive and profi able dealer prop-osition.

DO YOU WANT THE HUMIDIFIER BUSINESS ON A PRICE AND EFFICIENCY BASIS

Now is the time to take on the **FULTON Line** 

PATENT NOVELTY CO...

Fulton, III.



30" 36" 42" 48" 54" 60"

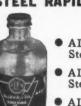
G.E. Motors

ALCO MANUFACTURING CO.

2619 Milam St.

Houston, Tex.

#### SODER STAINLESS STEEL RAPIDLY



- **ALLEN Stainless** Steel Soder
- **ALLEN Stainless** Steel Flux
- **ALLEN Stainless** Steel Polish

Send your letterhead for FREE SAM-PLES and Booklet.

L. B. ALLEN Co., Inc. 6702 Bryn Mawr Chicago, III.



The handy test set includes CO<sub>2</sub> Indicator. Stack Thermometer, and Draftrite. Every service man and dealer should be equipped with a set. Also very practical in the laboratory. Price \$23.44

Write today for literature.

#### COLE-SULLIVAN ENGINEERING CO.

1316 Third Street Minneapolis, Minn.

#### CUSTOM FABRICATION OF ALL ALLOYS STAINLESS-MONEL-COPPER. ETC.

Custom fabrication of all alloys with satisfaction guaranteed. Send blueprints for prices and delivery. Years of experience guarantee re-sponsible and accurate work. TERMS CASH WITH ORDER. Write today for further information.

RIESTER & THESMACHER COMPANY
SHEET METAL PRODUCTS
1526 W. 25th St., Cloveland, O.



## NOW YOU CAN SODER ALUMINUM

permanently

WITH

#### ALUMI-SODER

Allen ALUMINUM Soder

Comes in bar and wire form-no flux needed

Send your letterhead for FREE sample

L. B. ALLEN Co., Inc. 6702 Bryn Mawr Chicago, III.

SERVICE SECTION: Rates — \$5.00 per inch per insertion. One inch minimum. CLASSIFIED SECTION: 5 cents for each word including heading and address. Count seven word for keyed address. \$1.00 minimum. Cash must accompany order.

## WILLIS HIPPED

SKYLIGHT and VENTILATOR

Constructed of quality materials to give greatest amount of light and maximum strength of construction. Ventilator is abso-lutely water tight. Pivoted metal dampers strength of construction. Verificator is asserting that provided metal dampers will be included with ventilators, so hung that normally they will be closed. Skylights can be constructed to any size required. Write today for catalog.

WILLIS MFG. COMPANY Galesburg, Illinois



America's largest stock New, Used, and Rebuilt achinery for Metal Fabri-ting and Structural Steel. cating and Structural Steel.
Sheet Metal Machinery,
Production Machinery, and
Machine Tools.

INTERSTATE'S LATEST

CATALOG 404 — FREEI
Completely indexed. Over
200 illustrations — Handsomely Printed — Durably
Bound for permanent references. Describes OVER
2000 machines in stock
ready for IMMEDIATE
SHIPMENT!

INTERSTATE MACHINERY CO., INC.

#### **BLOWERS - FANS - EXHAUSTERS**

THOROUGHLY REBUILT, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel GENERAL BLOWER CO., Engineers, 403 North Peoria Street. Chicago, Illinois.



## The Electric City Gutter Former

MAKE YOUR OWN GUTTER AS YOU WANT IT Easily and quickly operated. Soon pays for itself.

REPLACEMENTS Beading Rods, Handles, Rolls, etc., quickly furnished.

STERLING BEADER
A simple and inexpensive machine for forming round bead.

F. L. ROBERTSON
56 RANO STREET BUFFALO, N. Y.



## What FLUX Sample 7

Salts, Paste, Liquid, Oil

Tell us on your letterhead. We will send your choice.

• Sodering Salts

Sodering Paste

• Sodering Liquid

Sodering Oil



Buy Allen Fluxes & Soders at your Jobbers L. B. ALLEN Co., Inc. 6702 Bryn Mawr Chicago, III.

## AMÉRICAN ARTISAN ervice Section

#### DYER SPOT WELDERS

Sheet Metal Fabrication Machinery Chicago Steel Bending Brakes Lockformers-Whitney Tools Pexto Power and Hand Equipment Electric Tools—Small Shop Tools Sheet Metal and Ventilation Supplies FRED E. MILLER N. A. LINDVALL

"Always Ready to Serve You"

#### CENTRAL . WEST MACHINERY CO.

Tel. Haymarket 8361 335 S. Western Ave. Chicago, Ill.

#### YAGER'S Soldering Salts - Paste Reg.

Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.

1/2 lb., 1 lb., 5 lb. cans; 2 cz., 6 cz., 12 cz.

ALEX. R. BENSON CO., INC., HUDSON, N. Y.



#### SITUATIONS OPEN

WANTED—Old line leading furnace manufacturer has openings for experienced territory salesmen familiar with coal, oil and gas equipment. State age, qualifications, remuneration desired and territory preference in first letter. Address Key No. 526, American Artisan, 6 N. Michigan Ave., Chicago.

WANTED—Experienced sheet metal worker, must know sheet metal, air-conditioning and furnace work. State experience and references. Married man preferred. The Heyse Sheet Metal Works, Inc., Colorado Springs, Colorado.

19

Y.

1941

#### FOR SALE

On account of necessary expansion in other lines, we are offering for sale dies, equipment, and good will for the manufacture of metal ceiling of a special construction. Reasonable in price. A good opportunty to enter this field or to expand your present business. Address Key No. 522, American Artisan, 6 N. Michigan Ave., Chicago.

Have practically new Wodack Electric Groover. Cuts slate, concrete, brick, stone, raggles mortar joints for flashing. Price \$100.00. Address H. M. Whitaker Co., Rapid City, S. D.

FOR SALE: Blower \$14.00, Fan Switches \$4.75, Stokers \$80.00, Oil burning furnaces with blower \$89.75, Pressure type oil burners with controls \$55.00, Gas furnaces with controls \$58.75, Booster Fans \$5.50, Conversion gas burners with controls \$31.00, all new stocked merchandise. Address Biggs Supply, Lincoln, Nebr.

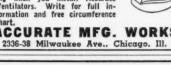
FOR SALE: Sheet Metal Works in Oregon, County seat. Well established and best equipped steet metal and heating shop in the county. Agriculture, logging and industrial territory. Wish to return on account of health. Address Key No. 525, American Artisan, 6 N. Michigan Ave., Chicago.

#### EASY MONEY with ACCURATE VENTILATORS

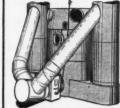
Accurate Revolving Ventilators enable you to complete a ventilating job with less fuss and bother because they are simply and readily attached to pipe. Top performance all the time is sesured the owner because this ventilator is backed by years of successful performance on many jobs.

Journal of the ask-ing when you install Accurate Ventilators. Write for full in-formation and free circumference

ACCURATE MFG. WORKS



#### THERMOSTATICALLY CONTROLLED AUTOMATIC



HEAT BOOSTER

Everything the Home Owner wants in a Furnace Fan—At a price Every Furnace Owner Can Afford to Pay.

Write Today or See Your Jobber A-C MANUFACTURING CO. PONTIAC



Now, men, you can have a Practical Crimper!

CHAMPION ACTION PIPE CRIMPER

Length—14 Inches.

Weight—one lb. 10 ozs.

Crimps plain round, square and rectangular pipe—quickly, perfectly and easily.

Can be used in the shop or carried conveniently in the tool kit to outside jobs.

Appreciated by those who install warm air furnace pipe, wall stacks, air ducts, smoke, conductor and water heater vent pipe, etc. Price \$2.50 f. o. b. Factory.

Jobbers and Installers:

Write for full details to-day.

CHAMPION TOOL COMPANY

376 West 41st Place, Los Angeles, Calif.

## RIBBED WIRE GLASS 1/4"

ISe per sq. ft.—Plus Boxing
f.o.b. our warehouse
STOCK SHEETS—CASE LOTS
Reasonable freight rates to all parts of U. S.
Salesmen wanted for several territories.
Cut sizes—2e per sq. ft. additional.
PROMPT SHIPMENTS—GOOD QUALITY T. J. ATCHESON GLASS CO. 955 MAIN ST. Buffale, N. Y.-U. S. A.



# SUPER AVIATION

Makes Difficult Cuts Easily on All Grades of Steel up to 16 Gauge . . .



 The compound action Penco Snips has serrated cutting edges that will not slip or turn. Blades are beveled and serrated cutting edges that will hot slip or turn. Blades are beveled and made from Chrome-vanadium alloy molybdenum steel. Will make a 1/4" short cut and up to 11/8" long cut, circular, irregular or straight. Will even cut BX cable, BX flexible tubing and wire up to 16 gauge. Price each, \$2.80; with rubber insulated handles \$3.00. Made in sight calleft hand. right or left hand.

Tools for the Roofer Order Today or Send for Circular

FRANK P. FREY CO.

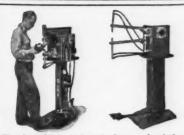
2634 W. Madison St. Chicago, Ill.

## Save Money, Time and Muscle Drill Concrete with the "Do-All" Combination Electric Hammer and Drill. Set expansions 10 to 20 times faster than with hand too Drills concrete, brick, stone, metal, wood. 2 to in 1. Easy to maintain—Pays for itself. Bullet No. 381 in 1. Easy to maintain and the No. 381. NO. 381. WODACK ELECTRIC TOOL CORPORATION 4644 W. Huren St., Chicago, III.

#### DWYER CO2 INDICATOR · Simple to Use. No Valves to Close.

· No Glass. • Consistent Scientific Accuracy . . . without previous experience. Write for Bulletin 22 Today! F. W. DWYER

MANUFACTURING COMPANY 575 W. Washington Blvd. Chicago

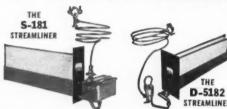


Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ½ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING COMPANY
CHAS. EISLER, PRES.
761 S. 13th St. (Near Aven Ave.) Newark, N. J.

# MAID-O'-MIST HUMIDIFIERS AND WATER LINE

## CONVECTOR HUMIDIFIERS FOR WARM AIR FURNACES



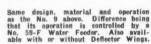
Efficient . . . streamlined to meet the modern trend of low bonnet temperatures . . . Maid-0'-Mist Convector Automatic Humidifiers are made in 14 sizes with one, two or four troughs from 15' to 34' in length. Will fit either straight or sloping bonnets. Equipped with patented copper dege removable evaporators. Troughs are only 1/4' wide and are spaced one inch apart, acting as flues to assure unrestricted air flow. Automatic Water Feed is standard No. 59-F, approved by National Plumbing Lab. against back siphonage.

#### No. 9 "ZEPHYR" AUTOMATIC HUMIDIFIER

This highly efficient pan type humidifier is designed for Air Conditioning furnaces where low or high bonnet temperatures prevail. Stamped of bronze in one piece, No. 35 Water Boy Feeder control water level in pan. Available with or without Patented Deflector Wings. Has over-saturation control feature... available in single, or twin pans for larger furnaces. Easy to install. Simple to remove for cleaning. Comes in 26" and 36" lengths.



#### No. 58-Z MAID-O'-MIST AUTOMATIC HUMIDIFIER





#### No. 20-H DRIP HUMIDIFIER

A competent, low price humidifier. Water is fed to the bronze pan by hand controlled sight feed Drip Water Valve. Boxed complete with 6 ft. of copper tubing and a saddle valve for quick, easy installation.



#### No. 85 WATER-BOY

#### SAFETY FEEDER



Write for Complete

Information and Prices

at Once!

The ideal water line control valve, for warm air furnaces or any other surross. Made in six different designs. Built completely of non-ferrous metals. Protected by wender Metal screen. Overall size is 2½" x 6½". Nickel Plated Finish.



No. 8 QUICK HOOK-UP SADDLE VALVE



VALVE

Built of brass and is convenient in controlling the water supply to humidifiers and feed valves.

#### No. 4 DUPLEX FILTER STRAINER

tect water feeders, valves, etc., from pipe scale and dirt.

No. 57-F



213 NORTH ABERDEEN STREET ILLINOIS



your furnace specifica-

## No. 59-F WATER-BOY FEED VALVE

CONTROL VALVES ARE STANDARD **EQUIPMENT ON MANY OF THE** 

COUNTRY'S POPULAR FURNACES

Maid-O'-Mist, Inc., manufacturers of the most complete line of efficient humidifiers for Warm Air Heating Systems present their 1941 line to the heating and air conditioning industry.

New, improved and better than ever, Maid-O'-Mist Humidifiers are setting the pace in the humidifier field. When you sell Maid-O'-Mist Humidifiers you will know that they will

evaporate more water per dollar invested than any other type.

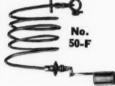
Convert hand fed humidifiers into
Automatic Humidifiers with this
Maid-O'-Mist No. 59-F Automatic
Water Supply Valve. Built completely of non-ferrous metals.
Easy to install. Monel Metal
Filter Sereen protects action.
Nickel Plated Finish. Boxed complete with saddle valve and Copper tubing.
APPROVED BY NATIONAL PLUMBING LAB. AGAINST BACK SIPHON-AGE.



#### No. 50-F WATER-BOY MIDGET FEEDER

Ask the owner who is Maid-O'-Mist equipped.

Converts Manual Bucket or Pan Type Humidifiers into efficient Automatic Humidifiers. Simple to install. Is only 7" long over all. Operates in water only 1" in depth. Adjustable. Has a Monel Metal Screen to protect operation. Made completely of non-ferrous metals. Boxed with or without copper supply tubing and saddle valve.



#### No. 51-F WATER-BOY MIDGET FEEDER

Same construction and fine materials as the No. 50-F. Difference being that action is protected by a smaller Monel Metal Screen,



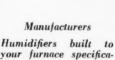
#### No. 57-F AUTO WATER FEEDER

Same size as the No. 50 valvo, except it has a self closing, heat resisting Neoprene removable valve unit. Can be replaced by ordinary automobile tire valve. Boxed with or without copper tubing and saddle valve.









#### Section of

**JANUARY, 1941** 

## AMERICAN ARTISAN

## 1941 DIRECTORY

OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

Section 1.—Products Classified

Section 2.—Trade Names

Section 3.—Manufacturers' Addresses

## HOW TO USE THIS DIRECTORY

If you want to know the names of one or more manufacturers making a certain product, look in Section I, where that product will appear in its proper place in the listing. If you have the trade name of a product and want to know who manufactures it, look in Section 2, where trade names are alphabetically listed. For the complete name and address of any manufacturer, look in Section 3.

• The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 304, for the page on which you will find the advertising of any of these manufacturers.

#### Section of

## American Artisan

## 1941 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

Section 1—PRODUCTS CLASSIFIED

 The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 304, for the page on which you will find the advertising of any of these manufacturers.

#### ADSORBERS, ODOR

Airox Company, New York City. (Chemical Neutralizer) Carbide & Carbon Chemicals Corp., New York City.

Connor Engineering Corp., W. B., Dorex Air Conditioning Div., New York City.

#### AIR CONDITIONING UNITS, CENTRAL PLANT, SUMMER

(Self-contained fan, filter and cooling coil unit for connection to refrigerating compressor or cold water supply with duct distribution of air)

of eir)

Airtemp Division, Chrysler Corp., Dayton, O.
Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Ballantyne Company, Omaha, Nebr.
Betz Air Conditioning Corp., Kansas City, Mo.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Carbondale Division, Worthington Pump & Machinery
Corp., Harrison, N. J.
Carrier Corp., Syracuse, N. Y.

Clarage Fan Co., Kalamazoo, Mich.
Corozone Air Conditioning Corp., Cleveland.
Curtis Refrigerating Machine Co., St. Louis.
Drayer & Hanson, Inc., Los Angeles, Cal.
Fairbanks, Morse & Co., Chicago.
Fedders Mfg. Co., Inc., Buffalo, N. Y.
Forman Machine & Electric Corp., New York City. (freon)
Frigidaire Commercial & Air Conditioning Division, Gentral Motors Sales Corporation, Dayton, O. tral Motors Sales Corporation, Dayton, O.
Garden City Fan Co., Chicago.
General Electric Co., Bloomfield, N. J.
General Refrigeration Division, Yates-American Machine
Co., Beloit, Wis.

Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Hoffman Specialty Co., Inc., Stamford, Conn.
Howe Ice Machine Co., Chicago.
Ilg Electric Ventilating Co., Chicago.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Kauffman Air Conditioning Corp., St. Louis.
Kennard, Sam, Inc., St. Louis.
Kramer Trenton Co., Trenton, N. J.
McCord Radiator & Mfg. Co., Detroit.
McQuay, Inc., Minneapolis, Minn.

Kramer Trenton Co., Trenton, N. J.

McCord Radiator & Mfg. Co., Detroit.

McQuay, Inc., Minneapolis, Minn.

Marlo Coil Co., St. Louis.

Meyer Furnace Co., Peoria, Ill.

Micheli Air Conditioning Co., Inc., Schenectady, N. Y.

Modine Mfg. Co., Racine, Wis.

Niagara Blower Co., New York City.

Palmer's Manufacturing Corp., Phoenix, Ariz.

Pernot & Rich, Inc., Los Angeles.

Premier Furnace Company, Dowagiac, Mich.

Red Jacket Mfg. Co., Davenport, Ia.

Refrigeration Economics Co., Inc., Canton, O.

Rempe Co., Chicago.

Roto-Beam Div., Peerless of America, Inc., Chicago.

Skinner Heating & Ventilating Co., Heater Div. of St.

Louis Blow Pipe & Heater Co., Inc., St. Louis.

Sturtevant Co., B. F., Boston.

Surface Combustion Corp., Toledo, O.

Timken Silent Automatic Div., The Timken-Detroit Axle

Co., Detroit.

Trane Co., LaCrosse, Wis.

OAdvertisement in this issue.

United States Radiator Corp., Detroit.

Waterman-Waterbury Co., Minneapolis.
Webster & Co., Warren, Camden, N. J. (Cold Water)
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
XL Refrigerating Co., Inc., Chicago.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

#### AIR CONDITIONING UNITS, CENTRAL PLANT, WINTER, SPLIT SYSTEM TYPE

(Self-contained fan, filter, humidifier and heating coil unit for connection to steam or hot water boiler with duct distribution of air)

•Airtemp Division, Chrysler Corp., Dayton, Ohio.
Aladdin Heating Corp., Oakland, Cal.
Allis-Chalmers Manufacturing Company, Milwaukee.
American Blower Corp., Detroit.
American Metal Products, Fort Worth, Tex.
Betz Air Conditioning Corp., Kansas City, Mo.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Carbondale Division, Worthington Pump & Machinery
Corp., Harrison, N. J.
Carrier Corp., Syracuse, N. Y.
•Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Co., St. Louis.
Easternoil, Inc., Portland, Maine.

Curtis Refrigerating Machine Co., St. Louis.
Easternoil, Inc., Portland, Maine.
Electrol Incorporated, Clifton, N. J.
Fairbanks, Morse & Co., Chicago.
Fedders Mfg. Co., Inc., Buffalo.
Fitzgibbons Boller Co., Inc., New York City.
Garden City Fan Co., Chicago.
General Electric Co., Bloomfeld, N. J.
Handelan Washed Air Company, Minneapolis.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Johnson Co., S. T., Oakland, Cal., and Philadelphia
Kauffman Air Conditioning Corp., St. Louis.
McQuay, Inc., Minneapolis.
Marlo Coil Company, St. Louis.
May Oil Burner Corp., Baltimore.

Mayflower Air Conditioning Co., Schenectady, N. Y.
Modine Mfg. Co., Racine, Wis.

Michell Air Conditioning Co., Schenectady, N. 1.

Modine Mfg. Co., Racine, Wis.

New York Blower Co., Chicago.

Pan-American Eng. Co., Berkeley, Cal.

Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.

Pocahontas Fuel Company Incorporated, Stoker Div., Cleveland.

Cleveland.

Refrigeration Economics Co., Inc., Canton, O. Richmond Radiator Co., Inc., Uniontown, Pa. Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
Roto-Beam Div., Peerless of America, Inc., Chicago.

Surface Combustion Corp., Toledo, O. Trane Co., LaCrosse, Wis.

U. S. Air Conditioning Corp., Minneapolis.
United States Radiator Corp., Detroit.
Utica Radiator Corp., Utica, N. Y.

Waterman-Waterbury Co., Minneapolis.
Western Blower Company, Seattle, Wash.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.

Wood Industries, Inc., Gar, Detroit. York Ice Machinery Corporation, York, Pa. Young Radiator Company, Racine, Wis.

#### AIR CONDITIONING UNITS, EVAPORATIVE TYPE, SUMMER

(For cooling with sprays, no dehumidification)

(For cooling with sprays, no dehumidification)

Air Equipment Co., Denver, Colo.

Air-O-Line Co., The, Dallas, Tex.

Air & Refrigeration Corp., New York City.

Alter Co., Harry, Chicago.

American Biower Corporation, Detroit.

American Metal Products, Fort Worth, Texas.

Arcweld Manufacturing Co., Inc., Seattle, Wash.

Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.

Ballantyne Company, Omaha, Nebr.

Bien Air Conditioning Co., Los Angeles, Cal.

Brundage Co., Kalamazoo, Mich.

Campbell Heating Co., E. K., Kansas City, Mo.

Coolmaster Corp., Chicago.

Dallas Engineering Co., Inc., Dallas, Tex.

Economy Electric Manufacturing Co., Cicero, Ill.

Electrogas Furnace Company, San Francisco, Cal.

Essick Manufacturing Co., Los Angeles, Cal.

Fairbanks, Morse & Co., Chicago.

Great National Air Conditioning Corp., Dallas, Tex.

Hall Mfg. Co., Cedar Rapids, Ia.

Hammond Aircraft Corp., South San Francisco, Cal.

Little Giant Vaporizer Co., Oklahoma City, Okla. (Vaporizers)

porizers)

Montag Stove & Furnace Works, Portland, Ore.

Mountain States Equipment Co., Denver, Colo.

Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.

Northwest Stove Works, Portland, Ore.

Pacific Gas Radiator Co., Huntington Park, Cal.

Palmer's Manufacturing Corp., Phoenix, Ariz.

Payne Furnace & Supply Co., Beverly Hills, Cal.

Pernot & Rich, Inc., Los Angeles.

Royal Air Conditioning Equipment, Alhambra, Cal.

Shreveport Eng. Co., Inc., Shreveport, La.

Spray Wheel Air Conditioners, Inc., Denver, Colo.

Todd Air Conditioning Co., Inc., Bonner Springs, Kansas.

U. S. Air Conditioning Corp., Minneapolis, Minn.

Utility Fan Corporation, Los Angeles, Cal.

Western Blower Company, Seattle, Wash.

X L Refrigerating Co., Inc., Chicago.

Young Radiator Company, Racine, Wis.

#### AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

(Self-contained blower, coil, filter unit for connection to remote compressor or cold water supply)

compressor or cold water supply)

Airgard Manufacturing Co., Chicago.

Airtemp Division, Chrysler Corp., Dayton, Ohio.

Ballantyne Co., Omaha, Nebr.
Carrier Corp., Syracuse, N. Y.
Crystal Refrigerator Co., Fremont, Nebr.
Dunham Co., C. A., Chicago.
Fairbanks, Morse & Co., Chicago.
Frigidaire Commercial & Air Conditioning Division, General
Motors Sales Corporation, Dayton, O.
General Air Conditioning Corp., Cincinnati, Ohio.
General Electric Co., Bloomfield, N. J.
Giant Mfg. Co., Council Bluffs, Iowa.
Hall Manufacturing Co., Cedar Rapids, Iowa.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Ilg Electric Ventilating Co., Chicago.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Kauffman Air Conditioning Corp., St. Louis.
Kennard, Inc., Sam, St. Louis.
Kennard, Inc., Sam, St. Louis.
Kennard, Inc., Minneapolis.
Nesbitt, Inc., John J., Philadelphia.

Norge Heating & Conditioning Div., Borg-Warner Corp.,
Detroit.
Norwin Co., Freeport, Ill.

Detroit.

Norwin Co., Freeport, Ill.
Perham Products, Inc., Chicago.

Premier Furnace Company, Dowagiac, Mich.
Refrigeration Economics Co., Inc., Canton, O.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Trane Company, LaCrosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.

U. S. Air Conditioning Corp., Minneapolis.
York Ice Machinery Corp., York, Pa.
X L Refrigerating Company, Inc., Chicago.
Young Radiator Company, Racine, Wis.

iv.,

ton.

941

## AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COMPRES-SOR, UNDER 3 H. P.

(Self-contained blower, coils, compressor and filter unit)

Airmode Manufacturing Co., Chicago.
 Airtemp Div., Chrysler Corp., Dayton, O.

Apex Rotarex Corp., Cleveland.
Carbondale Div., Worthington Pump & Machinery Corp.,
Harrison, N. J.
Carrier Corp., Syracuse, N. Y.
Certified Products Company, Toledo. (Window-Sill Mounted)
Corozone Air Conditioning Corp., Cleveland.
Curtis Refrigerating Machine Co., St. Louis.
Fairbanks, Morse & Co., Chicago.
Frigidaire Commercial & Air Conditioning Division, General
Motors Sales Corporation, Dayton, O.
Gale Products, Galesburg, Ill.
General Electric Co., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Governair Corporation, Oklahoma City, Okla.
Harvey-Whipple, Inc., Springfield, Mass.
Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
Ilg Electric Ventilating Co., Chicago.
Indian Trailer Corporation, Koolroom Div., Chicago.
Kauffman Air Conditioning Corp., St. Louis.

Meyer Furnace Co., Peoria, Ill.
Norge Heating & Conditioning Div., Borg-Warner Corp.,
Detroit.
Philco Radio & Television Corp., Philadelphia.
Pleasantaire Corp., Washington, D. C.

Detroit.

Philco Radio & Television Corp., Philadelphia.
Pleasantaire Corp., Washington, D. C.

Premier Furnace Company, Dowagiac, Mich.
Refrigeration Economics Co., Inc., Canton, Ohio.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Standard Stoker Corporation, New Albany, Ind.
Timken Silent Automatic Div., The Timken-Detroit Axle Co., Detroit.
Trane Co., LaCrosse, Wis.
Westinghouse Electric & Manufacturing Co., East Springfield, Mass.
York Ice Machinery Corp., York, Pa.

#### AIR CONDITIONING UNITS, ROOM TYPE, WINTER, FLOOR CABINET

(Self-contained blower, filter, heating coil, humidifier unit

Air & Refrigeration Corp., New York City.
Apex Rotarex Corp., Cleveland.
Burnham Boiler Corp., Irvington, N. Y.
Campbell Heating Company, Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.

Clarage Fan Co., Kalamazoo, Mich.
Drayer & Hanson, Inc., Los Angeles.
Dunham Co., C. A., Chicago, Ill.
Easternoil, Inc., Portland, Me.
Fairbanks, Morse & Co., Chicago, Ill.
Frigidaire Commercial & Air Conditioning Division, General
Motors Sales Corporation, Dayton, O.
General Electric Co., Bloomfield, N. J.
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard, Inc., Sam, St. Louis.
McQuay, Inc., Minneapolis, Minn.
Nesbitt, Inc., John J., Philadelphia.

Norge Heating & Conditioning Div. of Borg-Warner Corp.,
Detroit, Mich.

Detroit, Mich.
Perham Products, Inc., Chicago.
Refrigeration Economics Co., Inc., Canton, Ohio.
Reznor Mfg. Co., Mercer, Pa.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Somers, Inc., H. J., Detroit, Mich.
Surface Combustion Corp., Toledo, O.
Tenney Engineering, Inc., Bloomfield, N. J.
Trane Co., LaCrosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.

U. S. Air Conditioning Corp., Minneapolis.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

#### AIR CONDITIONING UNITS, ROOM TYPE, YEAR AROUND, FLOOR CABINET

(Self-Contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply and steam or hot water)

Air & Refrigeration Corp., New York City.

•Airtemp Division, Chrysler Corp., Dayton, Ohio.

Apex Rotarex Corp., Cleveland, O.

•Baker Ice Machine Co., Inc., Omaha, Nebr.

Beacon-Morris Corp., Boston. Betz Air Conditioning Corp., Kansas City, Mo.
Carbondale Division, Worthington Pump & Machinery
Corp., Harrison, N. J.
Carrier Corp., Syracuse, N. Y.

Clarage Fan Co., Kalamazoo, Mich.

Corozone Air Conditioning Corp., Cleveland, O. Curtis Refrigerating Machine Co., St. Louis.

Advertisement in this issue. See Index to Advertisers, page 304

Dunham Co., C. A., Chicago.
Fairbanks, Morse & Co., Chicago, Ill.
Frigidaire Commercial & Air Conditioning Division, General
Motors Sales Corporation, Dayton, O.
General Electric Co., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Grinnell Co., Inc., Providence, R. I.

Hastings Air Conditioning Company, Inc., Hastings, Nebr. Ilg Electric Ventilating Co., Chicago, Ill.

Jaden Manufacturing Co., Inc., F., Hastings, Nebr. Kauffman Air Conditioning Corp., St. Louis, Mo. Kennard, Inc., Sam, St. Louis.

McQuay, Inc., Minneapolis, Minn.

Modine Mfg. Co., Racine, Wis.

Nelson Corp., Herman, Moline, Ill.

Nesbitt, Inc., John J., Philadelphia.

Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.

Perham Products, Inc., Chicago.

Refrigeration Economics Co., Inc., Canton, Ohio.

Roto-Beam Div., Peerless of America, Inc., Chicago.

Tenney Engineering, Inc., Bloomfield, N. J.

Trane Co., La Crosse, Wis.

Unified Air Conditioner Co., Duluth, Minn.

York Ice Machinery Corp., York, Pa.

Young Radiator Co., Racine, Wis.

W

## AIR CONDITIONING UNITS, STORE TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COM-PRESSOR, 3 H. P. AND OVER

(Self-contained blower, coil, compressor, filter unit, with air discharge approximately 6 ft. above floor)

Airtemp Division, Chrysler Corp., Dayton, O.

Airtemp Division, Chrysler Corp., Dayton, O. Baker Ice Machine Co., Inc., Omaha, Neb. Buffalo Forge Co., Buffalo, N. Y.
Carbondale Division, Worthington Pump & Machinery Corporation, Harrison, N. J.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Co., St. Louis. Fairbanks, Morse & Co., Chicago.
Forman Machine & Electric Corp., New York City. (freon) Frick Co., Waynesboro, Pa.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Kauffman Air Conditioning Corp., St. Louis.
Niagara Blower Co., New York City.
Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.

Detroit. Refrigeration Economics Co., Inc., Canton, O. Roto-Beam Div., Peerless of America, Inc., Chicago. Trane Co., LaCrosse, Wis.

Vilter Mfg. Company, Milwaukee. Westinghouse Electric & Mfg. Co., East Springfield, Mass. Williams Oil-O-Matic Heating Corporation, Bloomington, III.

York Ice Machinery Corp., York, Pa.

AIR DIFFUSERS See Diffusers, Air

AIR FILTERS See Filters, Air

AIR METERS See Meters, Air Velocity, Direct Reading

> AIR WASHERS See Washers, Air

#### ANALYZERS, CO., PORTABLE

Bacharach Industrial Instrument Co., Pittsbur Barclay, Inc., Robert, Chicago.
Defender Automatic Regulator Co., St. Louis.

\*\*Dwyer Mfg. Co., F. W., Chicago.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
Friez & Sons, Julien P., Baltimore.
Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland.
Huyette Co., Inc., Paul B., Philadelphia.
Precision Control Co., San Francisco.
Preferred Utilities Corp., New York City.
Service to Industry, West Hartford, Conn.
Weaver Mfg. Co., Springfield, Ill. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

#### **ANEMOMETERS**

American Instrument Co., Silver Spring, Md.
Bristol Co., Waterbury, Conn.
Friez & Sons, Julien P., Baltimore, Md.
Hill Co., E. Vernon, Chicago Ill.
Hillinois Testing Laboratories, Inc., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Walker and Eder, Inc., New York City.
Wilson Products, Inc., Reading, Pa. (Thermometer)

#### ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Company of America, Pittsburgh, Pa.

American Brass Co., Waterbury, Conn.

Bethlehem Steel Co., Bethlehem, Pa.
Brasco Manufacturing Co., Harvey, Ill.
Byers Co., A. M., Pittsburgh, Pa.

Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

Chase Brass & Copper Co., Inc., Waterbury, Conn.
Colonial Alloys Co., Philadelphia.

Columbia Steel Co., San Francisco, Cal.
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Lukens Steel Co., Coatesville, Pa.

Milcor Steel Co., Milwaukee, Wis.

Republic Steel Corp., Cleveland, O.
Revere Copper and Brass Incorporated, New York City.
Skinner Heating & Ventilating Co., Div. St. Louis Blow
Pipe & Heater Co., Inc., St. Louis.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.

Youngstown Sheet & Tube Co., Youngstown, O.

**ARC WELDERS** See Welders, Arc

**ASBESTOS PAPER** See Paper, Asbestos

ATTIC FANS See Fans, Night Air Cooling

**AUTOMATIC HUMIDIFIERS** See Humidifiers, Furnace, Evaporation, Spray

#### BAFFLES, OIL BURNER & STOKER

Calesco Corporation, Lynn, Mass. Jones Products Company, Ferndale, Mich.
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Refractory & Insulation Corp., New York City.

> BAND SAWS See Saws, Band, Sheet Metal Cutting

See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)

#### BASES AND PADS, VIBRATION ISOLATING

Armstrong Cork Co., Lancaster, Pa. (Cork)
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, B. T., Jr., New Canaan, Conn.
Clarage Fan Co., Kalamazoo, Mich.
Cork Import Corp., New York City (Cork)
Cork Insulation Co., Inc., New York, N. Y.
Crown Cork & Seal Co., Baltimore.
Felters Co., Inc., Boston.
Firestone Tire & Rubber Co., Akron, O.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O. (Rubber)
Keldur Corporation, New York City.
Korfund Co., Inc., Long Island City, N. Y.
Lord Mfg. Co., Erle, Pa.
Manley Products Corp., York, Pa.
Mundet Cork Companies, Kearny, N. J.
Vibration Eliminator Co., Astoria, N. Y. (Cork and rubber)
Western Felt Works, Chicago (Felt)

#### BATHS, TINNING

Retinning Manufacturing Co., Chicago.

BEAMS

See Angles, Bars, Beams, Channels and Tees (Light weight Shapes)

#### BEARINGS, BALL

Ahlberg Bearing Co., Chicago.
Bearing Co. of America, Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Link-Belt Co., Chicago.
Marlin-Rockwell, Jamestown, N. Y.
New Departure, Div. General Motors Sales Corp., Bristol,
Conn. Conn.

Nice Ball Bearing Co., Philadelphia.

Norma-Hoffman Bearings Corp., Stamford, Conn.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Shafer Bearing Corp., Chicago.

SKF Industries, Inc., Philadelphia.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Weod's Sons Co., T. B., Chambersburg, Pa.

#### BEARINGS, PILLOW BLOCK

BEARINGS, PILLOW BLOCK

Ahlberg Bearing Co., Chicago.

Air Controls Inc., Cleveland.
Caldwell Co., W. E., Louisville, Ky.

Central Die Casting & Mfg. Co., Inc., Chicago.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Co., Chicago.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mrg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Fdry. & Machine Co., Columbus, Ga.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Jones Foundry & Machine Co., W. A., Chicago.

Lau Blower Co., Dayton, Ohio.
Link-Belt Co., Chicago.
Medart Co., St. Louis.
Norma-Hoffmann Bearing Corp., Stamford, Conn.

Randall Graphite Products Corp., Chicago.
Royersford Foundry & Machine Co., Royersford, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Shafer Bearing Corp., Chicago.
SKF Industries, Inc., Philadelphia.
Smith, Inc., Winfield H., Springville, N. Y.
Sprout-Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.

Triangle Manufacturing Co., Oshkosh, Wis.

Viking Air Conditioning Corp., Cleveland.
Wood's Sons Co., T. B., Chambersburg, Pa.

#### BEARINGS, ROLLER

Dodge Mfg. Corp., Mishawaka, Ind. Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J. son, N. J.
Jones Foundry & Machine Co., W. A., Chicago.
Link-Belt Co., Chicago.
Medart Co., St. Louis.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Royersford, Pa.
Shafer Bearing Corp., Chicago.
SKF Industries, Inc., Philadelphia.
Timken Roller Bearing Co., Canton, Ohio.
Wood's Sons Co., T. B., Chambersburg, Pa.

#### BEARINGS, SLEEVE

Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Johnson Bronze Co., New Castle, Pa.
Medart Co., St. Louis.
Motex Metal Process Corporation, Detroit.
Randall Graphite Products Co., Chicago, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wood's Sons Co., T. B., Chambersburg, Pa.

#### BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee, Wis. American Pulley Co., Philadelphia. Browning Mfg. Co., Inc., Maysville, Ky. Chicago Belting Co., Chicago.

Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Firestone Tire & Rubber Co., Akron, Ohio. Firestone Tire & Rubber Co., Akron, Onio.

Gates Rubber Co., Denver, Colo.

Gilmer Co., L. H., Philadelphia, Pa.

Goodrich Co., B. F., Akron, O.

Goodyear Tire & Rubber Co., Akron, O.

Jones Foundry & Machine Co., W. A., Chicago.

Manhattan Rubber Mfg. Division of Raybestos-Manhattan,

Inc., Passaic, N. J.

Manheim Manufacturing and Belting Company, Manheim,

Proc. Adjustable. Manheim Manufacturing and Belting Company, Manheim, Pa. (Adjustable)
Medart Co., St. Louis.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Mfg. Co., Indianapolis, Ind.
Thermoid Rubber Div. of Thermoid Co., Trenton, N. J.
United States Rubber Co., New York City.
Wood's Sons Co., T. B., Chambersburg, Pa.

#### BENDERS, 'ANGLE, ETC.

Excelsior Tool and Machine Co., East St. Louis, Ill. Hendley & Whittemore Co., Beloit, Wis. Hossfield Mfg. Co., Winona, Minn.

•Whitney Metal Tool Company, Rockford, Ill.

#### BI-METALS, THERMOSTATIC

 Chace Co., W. M., Detroit, Mich.
 General Plate Co., Attleboro, Mass.
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Wilson Co., The, H. A., Newark, N. J.

#### BLADES, PROPELLER FAN

BLADES, PROPELLER FAN

Aerovent Fan Co., Piqua, Ohio.

Air Controls, Inc., Cleveland.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.

Allen Corp., Detroit.

Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators & Devices Mfg. Corp., New York City.
Circulators & Devices Mfg. Corp., New York City.
Dallas Engineering Co., Inc., Dallas, Texas.
DeBothezat Vent. Eq. Div., American Machine & Metals,
Inc., East Moline, Ill.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Aire Company, Philadelphia.
General Regulator Corp., Chicago.
International Engineering, Inc., Dayton, Ohio.
Lohman, Inc., William J., New York City.
Manker Products Company, Inc., Memphis, Tenn.
Meier Electric & Machine Co., Indianapolis, Ind.
Myers Electric Co., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Peerless Electric Co., Warren, O.
Roto-Beam Div., Peerless of America, Chicago.
Schwitzer-Cummins Company, Indianapolis, Ind.
South Bend Air Products, Inc., South Bend, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swift Mfg Co., Detroit, Mich.
Torrington Mfg. Co., Torrington, Conn.

Outility Fan Corporation, Los Angeles.

#### BLAST GATES

Airtherm Mfg. Co., St. Louis, Mo.

Berger Bros. Co., Philadelphia, Pa.
Blower Application Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis.
Garden City Fan Co., Chicago, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Mayville, Wis.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
R-S Products Corp., Philadelphia, Pa.
Spencer Turbine Co., Hartford, Conn.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Western Blower Co., Seattle, Wash.

Index to Advertisers, page 304

r)

#### BLINDS, VENETIAN

Athey Co., Chicago.

Bostwick-Goodell Co., Norwalk, Ohio.

Chain Tape Venetian Blind Co., Chicago.

Chicago Venetian Blind Co., Chicago.

Columbia Mills, Inc., Saginaw, Mich.

Higgin Products, Inc., Newport, Ky.

Hough Shade Corporation, Janesville, Wis.

Kane Mfg. Corporation, Kane, Pa.

Miller-Connell Mfg. Co., Inc., Chicago.

Mitchell Moulding Co., Forest Park, Ill.

Patterson Shade Co., Indianapolls, Ind.

Schatz Venetian Blinds, Los Angeles.

Snead, Herbert S., New York City.

Standard Products Co., Detroit.

Swedish Venetian Blind Co., New York City.

Warren Shade Co., Inc., Minneapolis, Minn.

Western Venetian Blind Co., New York City.

Yardley Venetian Blind Co., Columbus, Ohio.

#### **BLOWER—FILTER UNITS**

#### (Separate, Conversion Units for Warm Air Furnaces)

Separate, Conversion Units for Warm Air Furnaces)

Agricola Furnace Co., Inc., Gadsden, Ala.
Air Conditioning Equipment Co., Minneapolis, Minn.
Air Controls, Inc., Cleveland, O.
American Foundry & Furnace Co., Bloomington, Ill.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace Co., St. Louis, Mo.
American Radiator and Standard Sanitary Corp., New York
City and Pittsburgh.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Auburn Burner Company, Auburn, Ind.
Baker Furnace & Cleaner Mig. Co., Toledo, O.
Bard Mig. Co., Bryan, O.
Bard Mig. Co., Bryan, O.
Bard Mig. Co., Bryan, O.
Bishop & Babcock Mig. Co., Cleveland, O.
Bishop & Babcock Mig. Co., Cleveland, O.
Brundage Co., Kalamasso, Mich.
Bryant Corp., C., Cleveland,
Campbell Heating Co., Des Moines, Ia.
Char-Gale Mig. Co., Minneapolis.
Cleveland Steel Products Corp., Torldheet Div., Cleveland.
Comfort Products Corporation, Harvey, Ill.
Conco Corporation, Mendota, Ill.
Des Moines Stove Repair Co., Des Molnes, Iowa.
Dowagiac Steel Furnace Company, Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
Economy Baler Co., Ann Arbor, Mich.
Beonomy Baler Co., Ann Arbor, Mich.
Gerbo Co., Hormandville, Mich.
Gerbo Co., Hormandville, Mich.
Gerbo Co., Hormandville, Mich.
Gerbo Co., Hormandville, Mich.
General Elower.
Grys. San Francisco.
Gilbert & Barker Mig. Co., Springfeld, Mass.
Gilt Edge Furnace & Manufacturing Co., Milwaukee.
Green Colonial Furnace Company, Des Moines, Iowa.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfeld, Mass.
Hall-Neal Furnace & Foundry Co., Cleveland, O.
Henry Furnace Co., Marshalltown, Ia.
McLouth Air Conditioning Company, Inc., Hastings, Nebr.
Hellower Co., Dayton,

230

Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

•U. S. Air Conditioning Corp., Minneapolis.

•Utility Fan Corporation, Los Angeles.

•Viking Air Conditioning Corp., Cleveland, O.

•Waterman-Waterbury Co., Minneapolis, Minn.,

Wayne Automatic Relay Co., Fort Wayne, Ind.

Western Blower Co., Seattle, Wash.

Westinghouse Electric & Mfg. Co., East Springfield, Mass.

•Williamson Heater Co., Cincinnati, O.

#### BLOWER—WASHER UNITS, FOR CLEANING OR HUMIDIFYING

#### (Separate Conversion Units for Warm Air Furnaces)

(Separate Conversion Units for Warm Air Furnaces)

Air Stream Filter Corp., St. Louis.
Airwasher Corporation, Lansing, Mich.
American Blower Corporation, Detroit.
American Machine Products Co., Marshalltown, Ia.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bishop & Babcock Mfg. Co., Cleveland, O.

Brauer Supply Co., A. G., St. Louis.
Brundage Co., Kalamazoo, Mich.
Economy Baler Co., Ann Arbor, Mich.

Hess Warming & Ventilating Co., Chicago.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.

Mueller Furnace Co., L. J., Milwaukee, Wis.
New York Blower Co., Chicago.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Spray Wheel Air Conditioners, Inc., Denver, Colo.
Utica Radiator Corporation, Utica, N. Y.

Waterman-Waterbury Co., Minneapolis, Minn.

#### BLOWERS, FORCED DRAFT, FOR ASH PIT

American Blower Corp., Detroit.
Barrett Engineers, Cleveland Heights, O.
Bignall Co., Medina, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Burnwell Corp., Allentown, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Economy Electric Mfg. Co., Cicero, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
Garden City Fan Co., Chicago.
General Blower Co., Philadelphia.

Henry Furnace & Fdy. Co., Cleveland.
International Engineering, Inc., Dayton, O.
Mohler Co., J. K., Ephrata, Pa.
New York Blower Co., Chicago.
South Bend Air Products, Inc., South Bend, Ind.

Sturtevant Co., B. F., Hyde Park, Boston.
Universal Blower Co., Birmingham, Mich.

#### BLOWERS, FORCED DRAFT, FOR SMOKE PIPE

Barrett Engineers, Cleveland Heights, O.
DeBothezat Ventilating Equip. Div., American Machine &
Metals, Inc., East Moline, Ill.
Garden City Fan Co., Chicago.
Muncle Gear Works, Muncle, Ind.
New York Blower Co., Chicago.

#### BLOWERS, FURNACE CENTRIFUGAL

BLOWERS, FURNACE CENTRIFUGAL

Agricola Furnace Co., Inc., Gadsden, Ala.
Air Conditioning Equipment Co., Minneapolis, Minn.

Air Controls, Inc., Cleveland, O.
Aladdin Heating Corporation, Oakland, Cal.
American Blower Corp., Detroit, Mich.

American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Auburn Burner Company, Auburn, Ind.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.

Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Champion Blower & Forge Co., Lancaster, Pa.

Chandler Co., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.

Clarage Fan Co., Kalamazoo, Mich.
Economy Baler Co., Ann Arbor, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
Essick Manufacturing Co., Los Angeles.
Freed Products Co., Moline, Ill.
Furblo Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
General Blower Co., Philadelphia, Pa.
General Blower Corp., San Francisco.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.

Hall Manufacturing Co., Cedar Rapids, Iowa.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Henry Furnace & Foundry Co., Cleveland.
Hess Warming & Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Lau Blower Co., Dayton, O.
Lennox Furnace Co., Marshalltown, Iowa.
Majastic Co. Huntington, Ind.

11.

Lau Blower Co., Dayton, O.

Lennox Furnace Co., Marshalltown, Iowa.

Majestic Co., Huntington, Ind.

Mauer Engineering, Evanston, Ill.

Montag Stove & Furnace Works, Portland, Ore.

Mueller Furnace Co., L. J., Milwaukee, Wis.

National Manufacturing & Engineering Co., Detroit.

Nelson Corp., Herman, Moline, Ill.

New York Blower Co., Chicago.

Northern Furnace & Supply Company, Billings, Mont.

Pacific Gas Radiator Co., Huntington Park, Cal.

Palmer's Manufacturing Corp., Phoenix, Ariz.

Parker Heating & Manufacturing Co., St. Petersburg, Fla.

Peerless Electric Co., Warren, O.

Premier Furnace Co., Dowagiac, Mich.

Reynolds Mfg. Co., Grand Rapids, Mich.

Royal Air Conditioning Equip. Co., Alhambra, Cal.

Rudy Furnace Co., Dowagiac, Mich.

Ryniker Sheet Metal Works, Inc., Billings, Mont.

Security Stove & Mfg. Co., Kansas City, Mo.

Schwitzer-Cummins Co., Indianapolis, Ind.

Skinner Hig. & Vent. Co., Heater Div. of St. Louis Blow

Pipe & Heater Co., Inc., St. Louis.

Southern Fan & Blower Co., Dallas, Tex.

Spray Wheel Air Conditioners, Inc., Denver, Colo.

Sturtevant Co., B. F., Hyde Park, Boston.

Todd Air Conditioning Corp., Minneapolis, Minn.

Utility Fan Corporation, Los Angeles, Cal.

Viking Air Conditioning Corp., Cleveland, O.

Waterman-Waterbury Co., Minneapolis, Minn.

Western Blower Co., Seattle, Wash.

#### BLOWERS, VENTILATING SYSTEM (Capacity 4,000 c.f.m. up)

BLOWERS, VENTILATING SYSTEM
(Capacity 4,000 c.f.m. up)

Advance Fan & Blower Co., Detroit, Mich.

Alir Controls, Inc., Cleveland, O.
Allen Billmyre Corp., South Norwalk, Conn.
Aladdin Heating Corporation, Oakland, Cal.
American Blower Corp., Detroit, Mich.
American Blower Corp., Datroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Autovent Fan & Blower Co., Chicago, Ill.
Ballantyne Co., Omaha, Nebr
Bayley Blower Co., Milwaukee, Wis

Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.

Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Vent. Co., Columbus, O.
Coppus Engineering Corp., Worcester, Mass.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago.
Furblo Co., Hermansville, Mich.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Johnson Fan & Blower Corp., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.

Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Corp., Chicago, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, P. H., Bloomington, Ill.
Mon

•Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Heater & Ventilating Corp., St. Louis, Mo.
Todd Air Conditioning Co., Inc., Bonner Springs, Kans.
•U. S. Air Conditioning Corp., Minneapolis, Minn.
•Utility Fan Corporation, Los Angeles, Cal.
•Viking Air Conditioning Corp., Cleveland.
Western Blower Co., Seattle, Wash.
Wing Mfg. Co., L. J., New York City.

#### **BLOW PIPE EQUIPMENT** See Blast Gates; Collectors, Blow Pipe; Fittings. Blow Pipe

## **BOLTS, EXPANSION**

Chicago Expansion Bolt Co., Chicago.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., New York City.
National Lead Co., New York City.
Paine Co., The, Chicago.
Rawlplug Company, Inc., New York City.
Rolyan Corp., Chicago.
Star Expansion Bolt Co., New York City.
U. S. Expansion Bolt Co., Inc., York, Pa.

#### **BOLTS, TOGGLE AND ANCHOR**

Carty & Moore Engineering Co., Detroit.
Chicago Expansion Bolt Co., Chicago.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., New York City.
Grabler Mfg. Co., Cleveland.
Lamson & Sessions Co., Cleveland.
Paine Co., The, Chicago.
Rawlplug Company, Inc., New York City.

Republic Steel Corp., Cleveland.
Rolyan Corp., Chicago.
Star Expansion Bolt Co., New York City.
U. S. Expansion Bolt Co., Inc., York, Pa.

#### **BOOTS, FURNACE PIPE**

See Fittings and Accessories, Furnace Pipe

#### BRAKES, METAL WORKERS', HAND

Bath Company, Cyril J., Cleveland.
Bertsch & Co., Cambridge City, Ind.

• Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Nebr.

• Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Steelweld Machinery Co., Cleveland, O.

• Weiss & Co., H., New York City.

• Whitney Metal Tool Co., Rockford, Ill.

#### BRAKES, METAL WORKERS', PORTABLE

Dreis & Krump Mfg. Co., Chicago.
Eiker Mfg. Co., Ogallala, Nebr.
Harris, A. R., Hammond, Ind.
Whitney Metal Tool Co., Rockford, Ill.

#### BRAKES, METAL WORKERS', POWER

Bertsch & Co., Cambridge City, Ind.
Cincinnati Shaper Co., Cincinnati, O.

Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
New Albany Machine Mfg. Co., New Albany, Ind.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
Swaine Mfg. Co., Fred J., St. Louis.

Verson Allsteel Press Co., Chicago.

Welss & Co., H., New York City.

Whitney Metal Tool Co., Rockford, Ill.

BRUSHES, ACID

Cleveland Brush Factory, Inc., Cleveland, O. Lukens Metal Co., Thos. F., Philadelphia, Pa.

Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Potomac Mfg. Co., Philadelphia, Pa.
Schaefer Brush Mfg. Co., Milwaukee, Wis. (Rustproof)
Weiss & Co., H., New York City.

#### BRUSHES, FURNACE

Adams Company, The, Dubuque, Iowa.
 Baker Furnace & Cleaner Mfg. Co., Toledo, O. (for cleaning Chimneys)
 Farrell-Cheek Steel Company, Stoker Parts Div., Sandusky,

Mill-Rose Co., Cleveland, O.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Pilley Packing & Flue Brush Mfg. Co., Fort Madison, Iowa.
Schaefer Brush Mfg. Co., Milwaukee, Wis.
Swift Corp., Carl E., Holland, Mich.
Worcester Brush & Scraper Co., Worcester, Mass.

#### BUFFERS, GRINDERS, POLISHERS AND SANDERS, ELECTRIC

ELECTRIC

Baldor Electric Co., St. Louis.
Black & Decker Mfg. Co., Towson, Md.
Buckeye Portable Tool Co., Dayton, O.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Electrical Tool Co., Cincinnati, O.
Clark Jr. Electric Co., Jas., Louisville, Ky.
Continental Machines Incorporated, Minneapolis.
Detroit Surfacing Machine Co., Detroit.
Diehl Mfg. Co., Elizabethport, N. J.
Hammond Machinery Builders, Kalamazoo, Mich.
Haskins Co., R. G., Chicago.
Hobart Brothers Company, Troy, O.
Independent Pneumatic Tool Co., Chicago, Ill.
Jefferson Machine Tool Co., Cincinnati, Ohio.
Keller, Inc., Wm. H., Grand Haven, Mich.
Lee & Son Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Reynolds Electric Company, Chicago.
Skilsaw, Inc., Chicago, Ill.
Speedway Mfg. Co., Cicero, Ill.
Snap-On Tools Corp., Kenosha, Wis.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghampton, N. Y.
United States Electrical Tool Co., Cincinnati, O.
U. S. Electrical Motors, Inc., Los Angeles.
Van Dorn Electric Tool Corp., Chicago, Ill.

#### BURNERS, GAS, CONVERSION, RESIDENTIAL

Auburn Burner Co., Auburn, Ind.
Autogas Corp., Chicago.

Barber Gas Burner Co., Cleveland O.

Beck Engineering Combustion Kompany, St. Louis, Mo. Bryan Steam Corp., Peru, Ind.
Bryan Steam Corp., Peru, Ind.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Bryant Heater Co., Chicago, Ill.
Columbia Burner Co., Toledo, O.
Continental Stove Corp., Ironton, O.
Dalzen Manufacturing Co., Detroit.
Franklin Gas Heating Co., Cincinnati, Ohio.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand
Rapids, Mich.
Handley-Brown Heater Co., Jackson, Mich.

Rapids Mich.

Handley-Brown Heater Co., Jackson, Mich.

Hudson-Root Company, Brocton, N. Y.

Johnson Gas Appliance Co., Cedar Rapids, Iowa.

Kais Sunrise Works, Detroit.

Leahy Mfg. Co., Los Angeles, Cal.

Martin, J. O. & C. U., San Francisco.

Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.

National Machine Works, Chicago, Ill.

Roberts-Gordon Appliance Corp., Buffalo, N. Y.

Rotary Mfg. Co., Los Angeles, Cal.

Security Stove & Mfg. Co., Kansas City, Mo.

Sonner Burner Co., Winfield, Kans.

Standard Heating & Radiator Co., Pittsburgh, Pa.

Surface Combustion Corp., Toledo, O.

Vacuum Gas Burner Corp., Olean, N. Y.

Webster Engineering Co., Tulsa, Okla.

Zinc Co., John, Tulsa, Okla.

#### BURNERS, OIL, CONVERSION, RESIDENTIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Acme Oil Burner Company, Inc., Cedar Rapids, Ia. (Gun)
Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y.

Airtemp Division, Chrysler Corp., Dayton, Ohio.

Aldrich Co., Wyoming, Ill.

American Radiator & Standard Sanitary Corp., New York
City and Pittsburgh. (Gun)
Arcweld Mfg. Co., Inc., Seattle, Wash.
Auburn Burner Co., Auburn, Ind. (Gun and rotary)
Auto-Heat Corp., New York City. (Gun)
Automatic Burner Corp., Chicago, Ill. (Gun and rotary)
Badger Mfg. Co., Madison, Wis. (Gun)
Beckett Engineering Co., R. W., Elyria, Ohio. (Gun)
Bennett Co., Omaha, Nebr. (Gun)
Berryman Oil Burner Co., Chicago, Ill. (Gun, Gravity and
Rotary) Rotary)
Bethlehem Foundry & Machine Co., Bethlehem, Pa. (Gun)
Bovee Furnace Works, Waterloo, Ia.

Braden Engineering, Inc., Providence, R. I. (Pressure gun) Brigham Oil Burner Co, St. Louis, Mo. (Gravity) Bryan Steam Corp., Peru, Ind. (Rotary and gun)

Bryan Steam Corp., Peru, Ind. (Rotary and gun)

Calesco Corporation, Lynn, Mass. (Gun and gravity)
Caloroil Burner Corp., Hartford, Conn. (Atmospheric, gun, horizontal rotary, vacuum pressure, wall flame)
Campbell Machine Co., Minneapolis.
Cary Mfg. Co., Waupaca, Wis. (Gravity)
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia. (Gun)
Chalmers Oil Burner Co., Minneapolis, Minn. (Gun)

Chandler Company, Cedar Rapids, Iowa (Gun and gravity)
Chicago Steel Furnace Co., Chicago, Ill.
Cleveland Steel Products Corp., Toridheet Div., Cleveland,
O. (Gun and rotary)
Columbus Metal Products, Inc., Columbus, Ohio. (Gravity)
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.

Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.

D'Elia Oil Burner Co., Inc., Bridgeport, Conn. (Gun)
Des Moines Stove Repair Co., Des Moines, Iowa.

Dowagiac Steel Furnace Company, Dowagiac, Mich.
Easternoil, Inc., Portland, Me. (Gun)
Electrol Incorporated, Clifton, N. J.

Excello Oil Heating Corp., Omaha, Nebr.

Excelsior Steel Furnace Co., Chicago.
Fairfield Oil Heating Co., Inc., Greenwich, Conn. (Gun)
Fargo Foundry Co., Fargo, N. D. (Gun)
Florence Stove Co., Gardner, Mass. (Gravity)

Fluid Heat Division, Anchor Post Fence Co., Baltimore.

(Gun and Rotary)
Gasoroil Furnace Co., Chicago, Ill.
General Electric Co., Bloomfield, N. J.
General Oil Heating Corp., West New York, N. J. (Gun)
Gilbert & Barker Mfg. Co., Springfield, Mass. (Gun)
Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y. (Gun)
Green Colonial Furnace Company, Des Moines, Iowa. (Gun)

Hall-Neal Furnace Co., Indianapolis, Ind.
Hardinge Oil Burner Co., Chicago, Ill.

Green Colonial Furnace Company, Des Moines, Iowa. (Gun)

Hall-Neal Furnace Co., Indianapolis, Ind.

Hardinge Oil Burner Co., Chicago, Ill.

Hart Oil Burner Corp., Peoria, Ill. (Gun)

Harvey-Whipple, Inc., Springfield, Mass. (Gun)

Heatseal Burner Co., Omaha, Nebr. (Gun)

Hell Co., Milwaukee, Wis. (Gun)

Herco Oil Burner Corp., Lancaster, Pa.

Hess Warming and Ventilating Co., Chicago, Ill.

Hipoint Corp., Bellefontaine, O.

Holtum Mfg. Co., Freeport, Ill. (Gun)

Hotentot Co., Inc., Omaha, Nebr. (Gun)

Hubbard Co., Minneapolis, Minn. (Gun)

Iowa Foundry Co., Sloux City, Ia.

Johnson Mfg. Co., Waterloo, Ia. (Gun)

Johnson Mfg. Co., Waterloo, Ia. (Gun)

Kais Sunrise Works, Detroit, Mich. (Gravity and rotary)

Kaybar Burner Corp., Chicago, Ill.

Keith Furnace Co., Des Moines, Ia. (Gun)

Kleen Heet, Inc., Chicago, Ill. (Gun and Gravity)

Korth Oil Burner Corp., Roselle Park, N. J. (Rotary and gun)

Laco Oil Burner Co., Griswold, Ia. (Gun and Gravity)

Laco Oil Burner Corp., Abselte Lata, 2...

Laco Oil Burner Co., Griswold, Ia. (Gun and Gravity)

Landwehr Heating Corp., Philadelphia, Pa.

Leahy Mfg. Co., Los Angeles, Cal.

Leeson Co., T. F., Detroit, Mich. (Gun)

eLennox Furnace Co., Marshalltown, Iowa. (Gun—Pressure

Atomizing)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Gravity)
Littleford Bros., Cincinnati, O.
Macrae, Inc., Brooklyn. (Gun)

Mahan Oil Burner & Furnace Co., Elmhurst, Ill. (Gravity)

• Majestic Co., Huntington, Ind. (Gun)

Majestic Co., Huntington, Ind. (Gun)
Malleable Iron Fittings Co., Banford, Conn. (Gun)
May Oil Burner Corp., Baltimore, Md. (Gun)
Mayflower Oil Burner Corp., West New York, N. J. (Gun)
Meyer Furnace Co., Peoria, Ill. (Gun)
Micro-Westco, Inc., Bettendorf, Iowa.
Miller Co., Meriden, Conn.
Montag Stove & Furnace Works, Portland, Ore. (Gun)
National Airoil Burner Co., Philadelphia, Pa. (Gun)
National Iron Works, San Diego, Cal.
Nelson Corp., Herman, Moline, Ill. (Gun)
Norge Heating & Conditioning Div. Borg-Warner Corp., Dec.

Nelson Corp., Herman, Moline, Ill. (Gun)

Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Nu-Way Corp., Rock Island, Ill. (Gun)
Olsen Mfg. Co., C. A., Elyria, O. (Gun)
Pan-American Engineering Company, Berkeley, Cal. (Gun, rotary and turbine)
Paragon Oil Burner Corp., Brooklyn, N. Y.
Peerless Oil Burner Co., Inc., Kansas City, Mo. (Gravity)
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa. (Gun)
Peoples Oil Burner Co., Chicago, Ill. (Gravity)
Petroleum Heat & Power Co., Stamford, Conn. (Rotary and gun)

Petroleum Heat & Power Co., Stannord, Conn. (2012)

Pioneer Manufacturing Co., Cedar Rapids, Ia.

Preferred Utilities Manufacturing Corp., New York City.

Pressure Oil Burners, Inc., York, Pa. (Gun)

Quaker Mfg. Co., Chicago. (Gravity)

Quick Furnace & Supply Co., Des Moines, Ia.

Quiet Heet Burner Co., Brooklyn, N. Y.

R-S Products Corp., Philadelphia, Pa. (Gun)

Ray Oil Burner Co., San Francisco, Cal. (Gun, gravity and

Ray Oil Burner Co., San Francisco, Cal. (Gun, gravity and rotary)
Reif-Rexoll, Inc., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Cal. (Rotary)
Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Rybolt Heater Company, Ashland, Ohio. (Gun)
Sanmyer Corporation, Chicago.
Sandberg Sheet Metal Works, Portland, Ore.
Scott-Newcomb, Inc., St. Louis, Mo. (Gun)
Sentry Mfg. Co., Omaha, Nebr. (Gun)
Shedlov Oil Burners, Inc., Minneapolis, Minn. (Gravity, gun)
Silent Glow Oil Burner Corp., Hartford, Conn.
Silent Sloux Oil Burner Corp., Orange City, Ia. (Gravity)
Simplex Oil Heating Corp., New York City. (Gun, rotary and turbine)
Skinner Co., E. W., Fitchburg, Mass. (Gravity)
Sundstrand Engineering Co., Rockford, Ill. (Gun)
Sun-Ray Oil Burner Corp., Rockaway Park, N. Y. (Gun)
Syncro-Flame Burner Corp., Willimantic, Conn. (Gun, rotary)
Timken Silent Automatic Div., Timken-Detroit Axle Co.,
Detroit. (Gun and rotary)
Todd Combustion Equipment, Inc., New York City.
Uni-Fire Co., Detroit, Mich. (Rotary)
United States Burner Corp., Wethersfield, Conn. (Gun and rotary)
Valley Mfg. Co., Athol, Mass. (Gun and rotary)

0.

n)

ire (y)

ty)

un.

941

United States Burner Corp., Wethersfield, Conn. (Gun and rotary)
Valley Mfg. Co., Athol, Mass. (Gun and rotary)
Victor Oil Burner Mfg. Co., Hartford, Conn. (Gravity)
Volcano Burner Corp., New York City. (Gun)
Vortex Mfg. Co., Portland, Ore.

Waterman-Waterbury Co., Minneapolis. (Gun)
Wayne Oil Burner Corp., Fort Wayne, Ind. (Gun)
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill. (Gun)
Williams Oil-O-Matic Heating Corp., Bloomington, Ill. (Gun)
Wood Industries, Inc., Gar, Detroit, Mich. (Gun)
Woolery Machine Co., Minneapolis, Minn. (Gun)
York Ice Machinery Corp., York, Pa.
York Oil Burner Co., Inc., York, Pa. (Gun)

#### CABINETS AND CASINGS

Acme Tin Plate & Roofing Supply Co., Philadelphia.
Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.
Biersach & Niedermeyer Company, Milwaukee.
Brundage Co., Kalamazoo, Mich.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Metal Mfg. Co., Chicago.
Columbus Heating & Ventilating Co., Columbus, Ohio.

Columbus Heating & Stamping Co., Youngstown, Ohio.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Falstrom Co., Passaic, N. J.
General Blower Corp., San Francisco.
General Metal Products Co., St. Louis, Mo.
Hauserman Co., E. F., Cleveland.

Lau Blower Co., Dayton, Ohio.
Maysteel Products, Inc., Mayville, Wis.
Micheli Air Conditioning Co., Inc., Schenectady, N. Y.
Mullins Mfg. Corp., Warren, Ohio.
National Manufacturing & Engineering Co., Detroit.

Republic Steel Corp., Cleveland.

National Manufacturing & Engineering Co., Detroit.

Republic Steel Corp., Cleveland.

Riester & Thesmacher Co., Cleveland.

St. Charles Mfg. Co., St. Charles, Ill.

Skinner Heating & Vent. Co., Heater Div. of St. Louis Blow

Pipe & Heater Co., Inc., St. Louis.

Standard Pressed Steel Co., Jenkintown, Pa.

Steinhorst & Sons, Inc., Emil, Utica, N. Y.

#### CAPS AND TOPS, CHIMNEY

Accurate Mfg. Works, Chicago, Ill.

Accurate Mfg. Works, Chicago, Ill.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.

Allen Corp., Detroit, Mich.
Ames Co., W. R., San Francisco, Cal.
Chicago Metal Mfg. Co., Chicago, Ill.
Edwards Mfg. Co., Inc., Cincinnati, O.
Excelsior Steel Furnace Co., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Iwan Brothers, South Bend, Ind.
Lamb & Ritchie Co., Cambridge, Mass.
Little Burner Co., Inc., H. C., San Rafael, Cal.
Martin Metal Mfg. Co., Wichita, Kan.

Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Wis.
Neemes Foundry, Inc., Troy, N. Y.
Northern Furnace & Supply Company, Billings, Mont.
Osborn Co., J. M. & L. A., Cleveland.
Royal-Apex Mfg. Corp., Brooklyn.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Sterling Foundry Company, Sterling, Ill. (Cast iron)
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Vall Mfg. Co., Fort Wayne, Ind.

#### CASINGS See Cabinets and Casings

#### CEILINGS, METAL

Berger Mfg. Div., Republic Steel Corp., Canton, O. Brooklyn Metal Ceiling Co., Brooklyn, N. Y. Canton Steel Ceiling Mfg. Co., Canton, O. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O. Edwards Mfg. Co., Inc., Cincinnati, O. Friedley-Voshardt Co., Chicago, Ill. International Steel Company, Evansville, Ind.

Klauer Mfg. Co., Dubuque, Ia.
Martin-Parry Corp., York, Pa.
Mesker & Co., Geo. L., Evansville, Ind.

Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo. Reeves Steel & Mfg. Co., Dover, O.

Republic Steel Corporation, Cleveland.
St. Paul Corrugating Co., §t. Paul, Minn. Schoedinger Co., F. O., Columbus, O.
Southern States Iron Roofing Co., Savannah, Ga.

Tennessee Coal, Iron & Railroad Co., Birmingham, Mala. Wheeling Corrugating Co., Wheeling, W. Va.
Woolwine Metal Products Co., Los Angeles, Cal.

#### CEMENT, FURNACE

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago.

Armstrong Co., Detroit, Mich.
Buckeye Products Co., Cincinnati, O.
Carey Co., Philip, Lockland, Cincinnati, O.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Continental Products Co., Euclid, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Llning Co., Chicago, Ill.

Grant Wilson, Inc., Chicago. (Asbestos)
Green Fire Brick Co., A. P., Mexico, Mo.
Hercules Chemical Co., Inc., New York City.
Hetzel Roofing Products Co., Newark, N. J.
Johns-Manville, New York City.
Keasbey Co., Robert A., New York City. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Nebel Manufacturing Co., Cleveland.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, 'O.
Refractory & Insulation Corp., New York City..
Robinson Insulation Corp., New York City..
Robinson Insulation Corp., New York City..
Robinson Insulation Corp., New York City..
Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Sharpsburg, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Suel Engineering Co., Othicago, Ill.
Standard Suel Engineering Co., Chicago, Ill.
Standard Fuel Engineering Co., Chicago, Ill.
Standard Fuel Engineering Co., Chicago, Ill.
Standard Fuel Engineering Co., Othicago, Ill.
Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

#### CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago.
Baldwin-Hill Co., Trenton, N. J. (Rockwool)
Barrett Company, New York City.
Carey Co., Philip, Cincinnati, Ohio. (Asbestos, Mag., Rockwool) wool)
Carney Rockwool Co., Mankato, Minn. (Rockwool)
Chicago Fire Brick Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Insulating & Mfg. Co., Alexandria, Ind. (Rock

General Insulating & Mfg. Co., Alexandria, Ind. (Rock Wool)

Grant Wilson, Inc., Chicago. (Asbestos)
Hetzel Roofing Products Co., Newark, N. J.
Industrial Research, Lansdowne, Pa.
International Vermiculite Co., Springfield, Ill. (Vermiculite)
Johns-Manville, New York City (Asbestos)
Keasbey Co., Robert A., New York City. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kreshiel Co., J. H., Chicago (Asbestos, mineral wool)
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J. (Vermiculite)
National Engineering Products, Inc., Washington, D. C.
Norristown Magnesia & Asbestos Co., Norristown, Pa.

Owens-Corning Fiberglas Corp., Toledo, Ohio.
Pecora Paint Co., Philadelphia.
Poe Co., C. W., Cleveland. (Mineral Wool)
Pyrolite Products Co., Cleveland, O.
Ramtite Co., Div. of S. Obermayer Co., Chicago.
Refractory & Insulation Corp., New York City. (Wool)
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Texas.
Ruberoid Co., New York City. (Asbestos)
Rutland Fire Clay Co., Rutland, Vt. (Asbestos)
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh.
Schundler & Co., Inc., F. E., Joliet, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit.
Standard Lime & Stone Co., Baltimore.
Tennessee Products Corp., Nashville, Tenn. (Mineral Wool)
Therminsul Corp., Kalamazoo, Mich.
Thompson & Co., Pittsburgh, Pa.
United States Gypsum Co., Chicago. (Asbestos)
United States Mineral Wool Co., Chicago. (High temperature mineral wool)
Universal Zonolite Insulation Co., Chicago (Vermuculite)
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

#### CEMENT, ROOF

burgh, Pa. •Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

Acme Asbestos Covering & Flooring Co., Chicago.
Acme Refining Co., Cleveland, O. (Liquid and plastic)
Acorn Refining Co., Cleveland.
All States Roofers Equipment & Material Co., Chicago, Ill. Acme Refining Co., Cleveland, O. (Liquid and placorn Refining Co., Cleveland.

All States Roofers Equipment & Material Co., Chemstrong Co., Detroit.

Barber Co., Inc., Philadelphia, Pa.

Barber Asphalt Corp., Barber, N. J.

Barrett Co., New York City.

Calbar Paint & Varnish Co., Philadelphia, Pa.

Carey Co., Philip, Cincinnati, O.

Carter Paint Co., Liberty, Ind.

Celotex Corp., Chicago.

Certain-teed Products Corp., New York City.

Clinton Metallic Paint Co., Clinton, N. Y.

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Continental Products Co., Euclid, O.

Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Fintkote Co., New York City.

Ford Roofing Products Co., Chicago.

Glidden Co., Cleveland, O.

Hetsel Roofing Products Co., Newark, N. J.

Horn Co., A. C., Long Island City, N. Y.

Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)

Johns-Manville, New York City.

Klee Co., Geo. B., Cincinnati.

Koppers Company, Pittsburgh.

Krehbiel Co., J. H., Chicago.

Miller & Son, C. Arthur, Elmira, N. Y.

National Mfg. Corp., Tonawanda, N. Y.

Ohmlac Paint & Refining Co., Chicago, Ill.

Pecora Paint Co., Philadelphia, Pa. (Asbestos)

Presstite Engineering Co., St. Louis, Mo.

Pyrolite Products Co., Cleveland, O.

Rock Fleece Company, El Paso, Texas.

Ruberold Co., New York City.

Rutland Fire Clay Co., Rutland, Vt.

Thompson & Co., Pittsburgh, Pa.

Tropical Paint & Oil Co., Cleveland, O.

United States Gypsum Co., Chicago, Ill.

Wilhelm Co., A., Reading, Pa.

#### CHAIN, FURNACE

American Chain Div., American Chain & Cable Co., Inc., American Chain Div., American Chain & Cable York, Pa.

Bead Chair Mfg. Co., Bridgeport, Conn.
Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
Chain Products Co., Cleveland, O.
Corbin Screw Corp., New Britain, Conn.
Hart & Cooley Mfg. Co., Holland, Michigan.
McKay Co., York, Pa.
Russell Mfg. Co., John M., Naugatuck, Conn.
Turner & Seymour Mfg. Co., Torrington, Conn.

#### **CHANNELS**

See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)

#### CLEANERS, POLISHERS AND FINISHERS, METAL

(Liquid, Paste and Powder)

Pynosol Laboratories, Inc., Chicago.

#### CLEANERS, VACUUM, FURNACE

Baker Furnace & Cleaner Mfg. Co., Toledo, O.

Breuer Ellectric Mfg. Co., Chicago, Ill.
Brillion Furnace Co., Brillion, Wis.

Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Densmore-Quinlan Co., Kenosha, Wis.
Dickson & Eddy, New York City.

Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Electric Vacuum Cleaner Co., Inc., Cleveland, O.
Ideal Commutator Dresser Co., Sycamore, Ill.

Kent Co., Inc., Rome, N. Y.

National Super Service Co., Toledo, O.
Spencer Turbine Co., Hartford, Conn.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swift Corp., Carl E., Holland, Mich.

#### CLIPS, FASTENING, FOR ROOFING

American Sheet Metal Works, New Orleans, La. American Sheet Metal Works, New Orleans, La.
Bard Manufacturing Co., Bryan, O.

Berger Brothers Co., Philadelphia, Pa.
Bridesburg Foundry Co., Philadelphia, Pa.
Edwards Mfg. Co., Inc., Cincinnati, O.

Milcor Steel Co., Milwaukee, Wis.
National Stainless Clip Corp., New York City. (Stainless)

Osborn Co., J. M. & L. A., Cleveland, O.
Pfeifer, Wm., New York City.
Southbridge Roofing Co., Inc., Southbridge, Mass.

#### CLIPS AND TIPS, DAMPER

•Adams Company, The, Dubuque, Iowa.

•Air Control Products, Inc., Muskegon, Mich.

•Berger Bros. Co., Philadelphia, Pa.

•Gerett Co., M. A., Milwaukee.

Goese Mfg. Co., Milwaukee.

Grand Rapids Die & Tool Co., Grand Rapids, Mich.

Griswold Mfg. Co., Erie, Pa.

•Hart & Cooley Mfg. Co., Holland, Mich.

Howes Co., S. M., Charlestown, Boston, Mass.

Kerentoff, G. L., Cincinnati.

•Meyer & Bro. Co., F., Peoria, Ill.

•Milcor Steel Co., Milwaukee.

•Mueller Furnace Co., L. J., Milwaukee, Wis.

Stover Mfg. & Engine Co., Freeport, Ill.

Young Regulator Co., Cleveland, O.

#### COAL BURNERS, AUTOMATIC See Stokers

#### COATINGS, PROTECTIVE, METAL

Glidden Company, Cleveland. Metalizing Co., Los Angeles, Cal. White & Co., Haydn F., Cleveland, O.

#### COILS, COOLING, DIRECT EXPANSION, FINNED

Acme Industries, Inc., Jackson, Mich.
Advanced Refrigerating Systems Co., Philadelphia.
Aerofin Corp., Syracuse, N. Y.

Airtemp Div., Chrysler Corp., Dayton, Ohio.
American Coils, Inc., Newark, N. J.
Beacon-Morris Corp., Boston, Mass.
Bohn Aluminum & Brass, Detroit.
Bush Mfg. Co., Hartford, Conn.
Conditionaire Unit Co., Chicago.
Drayer & Hanson, Inc., Los Angeles, Cal.
Fedders Mfg. Co., Inc., Buffalo, N. Y.
Frigidaire Commercial & Air Cond. Div., General Motors
Sales Corp., Dayton, Ohio.

GG & O Mfg. Co., New Haven, Conn.
General Electric Co., Bloomfeld, N. J.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis. Beloit, Wis.
Griscom-Russell Co., The, New York City. Griscom-Russell Co., The, New York City.
Kaufman Air Conditioning Corp., St. Louis, Mo.
Kennard, Inc., Sam, St. Louis.
Kramer Trenton Co., Trenton, N. J.
Larkin Colls, Inc., Atlanta, Ga.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturer's Fin Coil Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Mojonnier Brothers Co., Chicago.
Murray Mfg. Co., D. J., Wausau, Wis.
Peerless of America, Inc., Chicago.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Reliance Refrigeration Machine Co., Chicago.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.

Rome-Turney Radiator Co., Rome, N. Y. Standard Galvanizing Co., Chicago, Ill. Super Radiator Corp., Minneapolis. Tenney Engineering, Inc., Bloomfield, N. J. Tilco-Fin, Inc., Brooklyn, N. Y. Trane Co., La Crosse, Wis. Vilter Mfg. Co., Milwaukee, Wis. Wolverine Tube Co., Detroit. X L Refrigerating Company, Inc., Chicago. Yates-American Machine Co., Beloit, Wis. York Ice Machinery Corp., York, Pa. Young Radiator Co., Racine, Wis.

#### COILS, COOLING, WATER

Acme Industries, Inc., Jackson, Mich.
Advanced Refrigerating Systems Co., Philadelphia.
Aerofin Corp., Syracuse, N. Y.
American Coils, Inc., Newark, N. J.
Alrtemp Div., Chrysler Corp., Dayton, Ohio.
Beacon-Morris Corp., Boston, Mass.
Bohn Aluminum & Brass, Detroit, Mich.
Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Drayer & Hanson, Inc., Los Angeles.
Fedders Mfg. Co., Inc., Buffalo, N. Y.
Foster Wheeler Corp., New York City.
Frigidaire Commercial & Air Con. Div., General Motors
Sales Corp., Dayton, Ohio.

G & O Mfg. Co., New Haven, Conn.
General Electric Co., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co.,

General Electric Co., New Haven, Conn.
General Electric Co., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis.
Griscom-Russell Co., The, New York City.
Industrial Mfg. & Eng. Co., Chicago.
Johnson Fan & Blower Corp., Chicago.
Kauffman Air Conditioning Corp., St. Louis.
Kennard, Inc., Sam, St. Louis.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturer's Fin Coil Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Mojonnier Brothers Co., Chicago.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia.
Peerless of America, Inc., Chicago, Ill.
Perfex Corporation, Milwaukee.
Refrigeration Appliances, Inc., Chicago, Ill.

Refrigeration Appliances, Inc., Chicago, Ill. Refrigeration Economics Co., Inc., Canton, O. Refrigeration Economics Co., Inc., Canton, O. Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Galvanizing Co., Chicago, Ill.
Super Radiator Corp., Minneapolis.
Tenney Engineering, Inc., Bloomfield, N. J.
Tilco-Fin, Inc., Brooklyn, N. Y.
Trane Co., La Crosse, Wis.
Wilter Mfg. Co., Milwaukee, Wis.
Wing Manufacturing Co., L. J., New York City.
Wolverine Tube Co., Detroit.
X L Refrigerating Co., Inc., Chicago.
Yates-American Machine Co., Beloit, Wis.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

Adams Company, The, Dubuque, Iowa,

#### COILS, FIRE POT, HOT WATER

 Air Controls, Inc., Cleveland, O.
 American Furnace & Foundry Co., Milan, Mich.
 Bell & Gossett Co., Chicago. Bell & Gossett Co., Chicago.

Brauer Supply Co., A. G., St. Louis.
Deshler Foundry & Machine Works, Deshler, O.
Devlin Mfg. Co., Thos., Burlington, N. J.
Dowagiac Steel Furnace Co., Dowagiac, Mich.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Globe Machinery & Supply Co., Des Moines, Ia.
Harvey-Whipple Inc., Springfield, Mass.
Hotstream Heater Co., Cleveland, O.
Kitson Co., Philadelphia, Pa.
Marshall Furnace Co., Marshall, Mich.
Melbye Bros., Inc., Chicago, Ill.
Metsner Stove Repair Co., Kansas City, Mo.
Miller & Son, C. Arthur, Elmira, N. Y.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Mueller Furnace Co., L. J., Milwaukee, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Rudy Furnace Co., Dowagiac, Mich.
Taco Heaters, Inc., New York City.

#### COILS, HEATING

COILS, HEATING

Aerofin Corp., Syracuse, N. Y.
American Coils, Inc., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corporation, Boston, Mass.
Bohn Aluminum & Brass, Detroit.
Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Drayer & Hanson, Inc., Los Angeles.
Fedders Mfg. Co., Inc., Buffalo.
Foster Wheeler Corp., New York City.
Frigidaire Commercial & Air Cond. Div., General Motors
Sales Corp., Dayton, Ohio.

G & O Mfg. Co., New Haven, Conn.
General Electric Co., Bloomfield, N. J.
Griscom-Russell Co., New York City.
Industrial Manufacturing & Eng. Co., Chicago.
Johnson Fan & Blower Corp., Chicago.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Kennard, Inc., Sam, St. Louis.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturer's Fin Coll Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago.
Niagara Blower Co., Chicago.
Niagara Blower Co., Chicago.
Niagara Blower Co., Rome, N. Y.
Super Radiator Corp., Minneapolis.
Tenney Engineering, Inc., Chicago, Ill.
Perfex Corporation, Milwaukee.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Super Radiator Corp., Minneapolis.
Tenney Engineering, Inc., Bloomfield, N. J.
Tilco-Fin, Inc., Brooklyn, N. Y.
Trane Co., La Crosse, Wis.
Wing Mfg. Co., L. J., New York City.
Wolverine Tube Co., Detroit.
Yates-American Machine Co., Beloit, Wis.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

#### COLLECTORS, BLOW PIPE

Airtherm Mfg. Co., St. Louis, Mo.
Allen Billmyre Corp., South Norwalk, Conn.

American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., Detroit.
American Foundry Equipment Co., Mishawaka, Ind.
Bayley Blower Co., Milwaukee, Wis.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson, H., New York City.
Buffalo Forge Co., Buffalo, N. Y.
Clark Dust Control Company, Chicago.
Day Co., Minneapolis, Minn.
Dracco Corp., Cleveland, O.
Falstrom Co., Passaic, N. J.
Faraday Engineering Co., Boston.
Garden City Fan Co., Chicago, Ill.
Goethel Co., Alfred C., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich. Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knickerbocker Co., Jackson, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
New York Blower Co., Chicago, Ill.
Northern Blower Co., Chicago, Ill.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Prat-Daniel Corp., Port Chester, N. Y.
Puhl & Hepper Mfg. Co., Inc., St. Louis.
Research Corp., New York City.
Ruemelin Mfg. Co., Milwaukee.
Schneible Co., Claude B., Chicago.
Skinner Heating & Vent. Co., Heater Div. of St. Louis
Blow Pipe & Heater Co., Inc., St. Louis.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldon Co., Muncy, Pa.
Steamaire Co., Cincinnati, O.
Strandwits & Co., Inc., W. J., Camden, N. J.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Sturtevant Mill Co., Dorchester, Boston.
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles.
Young & Bertke Co., Cincinnati, O.

#### COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York City. Acme Refining Co., Cleveland, O. Allmetal Weatherstrip Co., Chicago, Ill.

Advertisement in this issue. See Index to Advertisers, page 304

Alpha Metal & Rolling Mills, Inc., Brooklyn. American Barlock Co., Inc., Long Island City, N. Y. American Metal Weather Strip Co., Grand Rapids, Mich.

Anpa Metal & Rolling Mills, Inc., Brooklyn.
American Barlock Co., Inc., Long Island City, N. Y.
American Metal Weather Strip Co., Grand Rapids, M

Armstrong Co., Detroit.

Asphalt Products Co., Syracuse, N. Y.
Barber Asphalt Corporation, Barber, N. J.
Barland Weatherstrip Material Co., Cleveland.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Cincinnati, O.
Chamberlin Metal Weatherstrip Co., Detroit.
Clinton Metallic Paint Co., Clinton, N. Y.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus, O.
Ford Roofing Products Co., Chicago.
Flintkote Co., New York City.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Johns-Manville, New York City.
Klee Co., Geo. B., Cincinnati.
Krehbiel Co., J. H., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lehon Company, Chicago.
Maas and Waldstein Co., Newark, N. J.
Metropolitan Refining Co., Long Island City, N. Y.
Nebel Manufacturing Co., Cleveland.
North American Fibre Products Co., Cleveland.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis.
Pyrolite Products Co., Cleveland, O.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Smooth-on Mfg. Co., Jersey City, N. J.
Thompson & Co., Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.
Yardley Venetian Blind Co., Columbus, Ohio.

#### COMPOUNDS, GLAZING

Acme Refining Co., Cleveland, O.
American Barlock Co., Inc., Long Island City, N. Y.

Armstrong Co., Detroit.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus, O.
Goodrich Co., B. F., Akron, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Lastik Products Co., Inc., Pittsburgh, Pa.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis.
Pyrolite Products Co., Cleveland, O.
Thompson & Co., Pittsburgh, Pa.
X-Pando Corporation, Long Island City, N. Y.

#### COMPOUNDS, TINNING

Alpha Metal & Rolling Mills, Inc., Brooklyn.
American Barlock Co., Inc., Long Island City, N. Y.
American Solder & Flux Co., Philadelphia, Pa.
Burnley Battery & Mfg. Co., North East, Pa.
Eagle-Picher Lead Co., Cincinnati, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
McNamee Products, Glencoe, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
Motex Metal Process Corporation, Detroit.
Potomac Mfg. Co., Philadelphia, Pa.

Ruby Chemical Co., Columbus, O.

#### COMPOUNDS, WATER-PROOFING

Acorn Refining Co., Cleveland, Ohio.
American Barlock Co., Inc., Long Island City, N. Y.
Asphalt Products Co., Syracuse, N. Y.
Barber Asphalt Corp., Barber, N. J.
Barrett Co., New York City.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Carey Co., Philip, Cincinnati, O.
Continental Products Co. Euclid, Ohio.
Ford Roofing Products Company, Chicago.
Flintkote Co., New York City.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., The, Cleveland.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Johns-Manville, New York City.
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh.
Lastik Products Co., Inc., Pittsburgh, Pa. Lastik Products Co., Inc., Pittsburgh, Pa.

Pecora Paint Co., Philadelphia, Pa.
Presstite Engineering Co., St. Louis.
Pyrolite Products Co., Cleveland.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh.
Sauereisen Cements Co., Sharpsburg, Pa.
Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.
Technical Coatings, Inc., Brooklyn, N. Y.
Thompson & Co., Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.

#### COMPRESSORS, REFRIGERATING

COMPRESSORS, REFRIGERATING

Airtemp Division Chrysler Corp., Dayton, Ohio.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Brunner Mfg. Co., Utica, N. Y.
Carbondale Division, Worthington Pump & Machinery
Corporation, Harrison, N. J.
Carrier Corp., Syracuse, N. Y.
Copeland Refrigeration Corp., Sidney, Ohio.
Corozone Air Conditioning Corp., The, Cleveland.
Curtis Refrigerating Machine Co., St. Louis, Mo.
De La Vergne Engine Co., Eddystone, Pa.
Fairbanks, Mcrse & Co., Chicago.
Frick Co., Waynesboro, Pa.
Frigidaire Commercial & Air Conditioning Division, General
Motor Sales Corporation, Dayton, O.
Gale Products, Galesburg, Ill.
General Electric Co., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis.
Hardy Mfg. Co., Dayton, O.
Howe Ice Machine Co., Chicago.
Ingersoil-Rand, New York City.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit.
Merchant & Evans Co., Philadelphia, Pa.
Mills Novelty Co., Chicago, Ill.
Modern Equipment Corp., Defiance, Ohio.
Nash Refrigeration Co., Inc., Newark, N. J.
Norge Htg. & Conditioning Div., Borg-Warner Corp., Detroit.
Phoenix Ice Machine Co., Cleveland.
Reliance Refrigeration Machine Co., Chicago, Ill.
Servel, Inc., Evansville, Ind.
Stewart Ice Machine Co., Los Angeles, Cal.
Tecumseh Products Co., Tecumseh, Mich.
Trane Co., LaCrosse, Wis.
Triumph Ice Machine Co., Cincinnati, O.
Uniflow Mfg. Co., Erie, Pa.
Universal Cooler Corp., Marion, Ohio.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Wittenmeier Machinery Co., Chicago, Ill.
York Ice Machinery Co., Chicago, Ill.
York Ice Machinery Co., Chicago, Ill.

#### CONDUCTOR PIPE

See Pipe, Conductor

#### CONNECTIONS, DUCT, FLEXIBLE (Asbestos, Canvas, etc.)

Canvas Products Co., St. Louis. Carpenter & Co., Geo. B., Chicago. Felters Co., Inc., The, Boston. • Wilson, Inc., Grant, Chicago. (Asbestos)

CONTROL SYSTEMS, FORCED AIR FURNACE,

HAND-FIRED (PACKAGE) (Bonnet Control of Blower)

Barber-Colman Company, Rockford, Ill. Barclay, Inc., Robert, Chicago. Cook Electric Co., Chicago.

Detroit Lubricator Co., Detroit.

Friez & Sons, Julien P., Baltimore.

•Mercoid Corporation, Chicago.

•Minneapolis-Honeywell Regulator Co., Minneapolis.

•Penn Electric Switch Co., Goshen, Ind.

Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.

Russell Electric Company, Chicago, Ill.

Sampsel Time Control, Inc., Spring Valley, Ill. Spencer Thermostat Company, Attleboro, Mass.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis.

#### CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Thermostat Control of Blower)

Barber-Colman Company, Rockford, Ill.
Cook-Electric Co., Chicago.

Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
General Controls Co., Glendale, Cal.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.
Penn Electric Switch Co., Goshen, Ind.
Russell Electric Co., Chicago.
Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Company, Attleboro, Mass.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis.

#### CONTROL SYSTEMS, GRAVITY FURNACE, HAND-FIRED (PACKAGE)

al

0.

ton.

1941

Automatic Products Co., Milwaukee.
Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Chicago.
Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
General Controls Co., Glendale, Cal.
Gleason-Avery, Inc., Auburn, N. Y.
Mercold Corporation, Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.

Pioneer Heat Regulator Div., Master Electric (Ohio.
Russell Electric Co., Chicago.
Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Company, Attleboro, Mass.
White Manufacturing Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis.

#### CONTROL SYSTEMS, ZONE DISTRIBUTION, COMPLETE

Au-Temp-Co Corp., New York City.
Barber-Colman Company, Rockford, Ill.
Cook Electric Co., Chicago.

Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.

Sampsel Time Control, Inc., Spring Valley, Ill.

#### CONTROLS, COMBINED FAN AND LIMIT, LINE **VOLTAGE**

Defender Automatic Regulator Co., St. Louis.

Defender Automatic Regulator Co., St. Louis.

Obtroit Lubricator Co., Detroit.

Friez & Sons, Julien P., Baltimore.

Mercoid Corporation, Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee.

Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.

Russell Electric Company, Chicago. United Electric Controls Co., South Boston, Mass. •White-Rodgers Electric Co., St. Louis.

#### CONTROLS, COMBINED FAN AND LIMIT, LOW VOLTAGE

Barber-Colman Company, Rockford, Ill.
Cook Electric Co., Chicago.
Defender Automatic Regulator Co., St. Louis.

Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
McCorkle Co., D. H., Berkeley, Cal.

Mercoid Corp., Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis.

Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Russell Electric Company, Chicago.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis.

#### CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LINE VOLTAGE

Cook Electric Co., Chicago.

General Controls Co., Glendale, Cal.
Hays Corp., Michigan City, Ind.

Mercoid Corporation, Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O. Russell Electric Co., Chicago.
Sampsel Time Control, Inc., Spring Valley, Ill.
United Electric Controls Co., South Boston, Mass.

#### CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LOW VOLTAGE

Cook Electric Co., Chicago.
Magnet Switch Co., Chicago.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee.

Pioneer Heat Regulator Div., Master Electric Co., Dayton, O. Russell Electric Co., Chicago.

Sampsel Time Control, Inc., Spring Valley, Ill.

White Manufacturing Co., St. Paul, Minn.

#### CONTROLS, EFFECTIVE TEMPERATURE

Barber-Colman Co., Rockford, Ill.
Friez & Sons, Julien P., Baltimore.
Johnson Service Co., Milwaukee, Wis.

Mercoid Corp., Chicago,
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.

#### CONTROLS, FAN, LINE VOLTAGE

Allen-Bradley Company, Milwaukee.
Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
Clark Controller Co., Cleveland.
Cook Electric Co., Chicago.

Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P. Baltimore.
General Controls Co., Glendale, Cal.
Gleason-Avery, Inc., Auburn, N. Y.
Hart Manufacturing Co., Hartford, Conn.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.
Paragon Electric Co., Chicago.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Ranco Inc., Columbus, O.
Russell Electric Co., Chicago.

Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.

White-Rodgers Electric Co., St. Louis.

#### CONTROLS, FAN, LOW VOLTAGE

Allen-Bradley Company, Milwaukee, Wis.
Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland.
Cook Electric Co., Chicago.

Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.

General Controls Co., Glendale, Cal.
Gleason-Avery, Inc., Auburn, N. Y.
McCorkle Co., D. H., Berkeley, Cal.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, C.
Russell Electric Co., Chicago.

Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis.

## CONTROLS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, PNEUMATIC

Atlas Valve Company, Newark, N. J.
Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Taylor Instrument Companies, Rochester, N. Y.

#### CONTROLS, LIMIT, LINE VOLTAGE

Allen-Bradley Co., Milwaukee, Wis. Cook Electric Co., Chicago, Ill.

Advertisement in this issue. See Index to Advertisers, page 304

- Detroit Lubricator Co., Detroit, Mich.

- Detroit Lubricator Co., Detroit, Mich. Fries & Sons, Julien P., Baltimore. Gleason-Avery, Inc., Auburn, N. Y. Hart Manufacturing Co., Hartford, Conn.
  Mercoid Corporation, Chicago, Ill.
  Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
  Penn Electric Switch Co., Goshen, Ind.
  Perfex Corporation, Milwaukee, Wis. Pioneer Heat Regulator Div., Master Electric Co., Dayton, O. Russell Electric Co., Chicago, Ill.
  Sampsel Time Control, Inc., Spring Valley, Ill. Sheer Co., H. M., Quincy, Ill. Spencer Thermostat Company, Attleboro, Mass. United Electric Controls Co., South Boston, Mass.
  White Manufacturing Co., St. Paul.
  White-Rodgers Electric Co., St. Louis, Mo.

#### CONTROLS, LIMIT, LOW VOLTAGE

- Allen-Bradley Company, Milwaukee, Wis.

  Automatic Products Co., Milwaukee, Wis.
  Barber-Colman Company, Rockford, Ill.
  Cook Electric Co., Chicago, Ill.

  Detroit Lubricator Co., Detroit, Mich.
  Friez & Sons, Julien P., Baltimore.
  General Controls Co., Glendale, Cal.
  Gleason-Avery, Inc., Auburn, N. Y.
  McCorkle Co., D. H., Berkeley, Cal.

  Mercoid Corp., Chicago.

  Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
  Penn Electric Switch Co., Goshen, Ind.
  Perfex Corporation, Milwaukee, Wis.
  Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
  Sampsel Time Control, Inc., Spring Valley, Ill.
  Spencer Thermostat Company, Attleboro, Mass.
  Russell Electric Co., Chicago, Ill.
  United Electric Controls Co., South Boston, Mass.

  White Manufacturing Co., St. Paul, Minn.

  White-Rodgers Electric Co., St. Louis, Mo.

#### CONTROLS, OIL BURNER, COMPLETE ASSEMBLY

- Au-Temp-Co Corp., New York City.

  Automatic Products Co., Milwaukee.
  Defender Automatic Regulator Co., St. Louis.

  Detroit Lubricator Co., Detroit, Mich.
  General Controls Co., Glendale, Cal.
  General Electric Co., Bloomfield, N. J.

  Marcoid Corporation, Chicago, Ill.

  Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

  Penn Electric Switch Co., Goshen, Ind.

  Perfex Corporation, Milwaukee, Wis.

  Luited Electric Controls Co., South Boston, Mass.
- United Electric Controls Co., South Boston, Mass.

#### CONTROLS, STOKER, COMPLETE ASSEMBLY

- Au-Temp-Co Corp., New York City.
  Defender Automatic Regulator Co., St. Louis.

  •Detroit Lubricator Co., Detroit, Mich.
  General Electric Co., Bloomfield, N. J.
  Gleason-Avery, Inc., Auburn, N. Y.
  Fries & Sons, Julien P., Baltimore.

  •Mercoid Corporation, Chicago, Ill.

  •Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
  Palmer Electric Co., Chicago.
- Minneapolis-Honeywell Regulator Co., Minneapolis, Minneapolis, Palmer Electric Co., Chicago.
  Paragon Electric Co., Chicago.
  Penn Electric Switch Co., Goshen, Ind.
  Perfex Corporation, Milwaukee, Wis.
  Pioneer Heat Regulator Div., Master Electric Co., Days-
- ton, O.
  Sampsel Time Control, Inc., Spring Valley, Ill.
  Spencer Theromstat Co., Attleboro, Mass.
  White-Rodgers Electric Co., St. Louis, Mo.

#### CONTROLS, WINDOW CONDENSATION

Barber-Colman Company, Rockford, Ill. Friez & Sons, Julien P., Baltimore, Md.

#### COOLING SURFACE See Coils, Cooling, Water

#### COPPERS, SOLDERING

- ●American Brass Company, Waterbury, Conn. Bernz Co., Inc., Otto, Rochester, N. Y. Chase Brass & Copper Co., Inc., Waterbury, Conn. Electric Materials Co., North East, Pa. Electric Soldering Iron Co., Inc., Deep River, Conn. Everhot Mfg. Co., Maywood, Ill. Gasweld Equipment Co., Chicago, Ill. (Acetylene) General Electric Co., Schenectady, N. Y. ◆Hussey & Co., C. G., Pittsburgh, Pa. Ideal Commutator Dresser Co., Sycamore, Ill.

Imperial Brass Mfg. Co., Chicago.
Linde Air Products Co., The, New York City.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.

Parker-Kalon Corp., New York City.
Peck, Stow & Wilcox Co., Southington, Conn.
Reiner & Campbell, Inc., New York City. (Carbide)
Revere Copper and Brass Incorporated, New York City.
Sight Feed Generator Co., Richmond, Ind.
Stanley Tools, New Britain, Conn.
Turner Brass Works, Sycamore, Ill.
Vulcan Electric Co., Lynn, Mass.

Weiss & Co., H., New York City.

#### COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Flexible Coupling Co., Erie, Pa.
Bartlett Hayward Co., Baltimore, Md.
Blood Brothers, Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Caldwell Co., W. E., Louisville, Ky.
Certified Flexible Couplings, Inc., New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Co., Chicago, Ill.
Congress Die Casting Div., Congress Tool & Die Co.,
Detroit.
Continental Diamond Fibre Co., Newark, Del.

Congress Die Casting Div., Congress Tool & Detroit.
Continental Diamond Fibre Co., Newark, Del.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dodge Mfg. Co., Mishawaka, Ind.
Flexo Supply Co., Inc., St. Louis, Mo.
Frederick Iron & Steel Co., Frederick, Md.
Guardian Utilities Co., Michigan City, Ind.
Jones Foundry Machine Co., W. A., Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Link-Belt Co., Chicago, Ill.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Mercury Clutch Corporation, Massillon, Ohio.
Monarch Mfg. Wks., Inc., Philadelphia.
Moran Flexible Steam Joint Co., Louisville, Ky.
Morse Chain Co., Ithaca, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Shallcross Co., Philadelphia, Pa.
Smith, Inc., Winfield H., Springville, N. Y.
Waldron Corp., John, New Brunswick, N. J.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

#### DAMPER MOTORS See Motors, Damper, Furnace Draft, Electrical

DAMPER CONTROLS See Regulators, Damper Sets

DAMPER REGULATOR SETS See Regulators, Damper Sets

#### DAMPERS, SMOKE PIPE

- OAMPERS, SMOKE PIPE

  Adams Company, The, Dubuque, Iowa.
  Brauer Supply Co., A. G., St. Louis, Mo.
  Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
  Calesco Corporation, Lynn, Mass.
  Char-Gale Mfg. Co., Minneapolis.
  Eselgroth & Co., Newark, N. J.
  Front Rank Furnace Div., Liberty Foundry Co., St. Louis
  Grand Rapids Die & Tool Co., Grand Rapids, Mich.
  Griswold Mfg. Co., Erie. Pa.
  Hart & Cooley Mfg. Co., Chicago, Ill.
  Hotstream Heater Co., Cleveland.
  Jewett Stove & Foundry Corp., Buffalo, N. Y.
  Keith Furnace Co., Des Moines, Ia.
  Littleford Bros., Cincinnati, O.
  Magnet Switch Co., Chicago.
  Maple City Furnace Co., Monmouth, Ill.
  Martin Metal Mfg. Co., Wichita, Kan.
  Metzner Stove Repair Co., Kansas City, Mo.
  Meyer & Bro. Co., F., Peoria, Ill.
  Milcor Steel Co., Milwaukee, Wis.
  Preferred Utilities Manufacturing Corp., New York City.
  Royal-Apex Mfg. Corp., Brooklyn, N. Y.
  Schoedinger, F. O., Co., Columbus, O.
  Stove Mfg. & Engine Co., Freeport, Ill.
  United States Register Co., Battle Creek, Mich.
  Walker Mfg. & Sales Corp., St. Joseph, Mo.
  Williamson Heater Co., Cincinnati, O.

#### DAMPERS, STACK HEAD

- Controlair, Inc., Elyria, Ohio.
- Advertisement in this issue. See Index to Advertisers, page 304

#### DIFFUSERS, AIR, HIGH VELOCITY

Air Devices, Inc., New York City.
Anemostat Corporation of America, New York City.
Barber-Colman Company, Rockford, Ill.
Demuth & Sons, Charles, Jamaica, N. Y.
Plandaire, Inc., Pittsburgh.

Tuttle & Bailey, Inc., New Britain, Conn.

Waterloo Register Co., Waterloo, Ia.

#### DOORS, HOLLOW METAL

Advance Insulating Co., Pittsburgh.
American Sheet Metal Works, New Orleans, La.
Bayer Co., A. J., Los Angeles, Cal.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Dahlstrom Metallic Door Co., Jamestown, N. Y. Dahlstrom Metallic Door Co., Jamestown, N. Y Decatur Iron & Steel Co., Decatur, Ala. Detroit Steel Products Co., Detroit. Edwards Mfg. Co., Inc., Cincinnati, O. International Steel Co., Evansville, Ind. Maysteel Products, Inc., Mayville, Wis. Metal Door & Trim Co., La Porte, Ind. Newman Brothers, Inc., Cincinnati, O. Perkinson & Brown, Chicago, Ill. Richmond Fireproof Door Co., Richmond, Ind. Truscon Steel Co., Youngstown, O.

#### DOORS, KALAMEIN

American Sheet Metal Works, New Orleans, La. Biersach & Niedermeyer Co., Milwaukee, Wis. Cincinnati Mfg. Co., Cincinnati, O. Dusing & Hunt, Inc., Buffalo.
Edwards Mfg. Co., Inc., Cincinnati, O. Empire Door Co., Inc., New York City.
Herrmann & Grace Co., Brooklyn, N. Y. International Steel Co., Evansville, Ind.
Lee & Son Co., Thomas, Cincinnati, O. Mahon Co., R. C., Detroit, Mich.
Mesker & Co., Geo. L., Evansville, Ind.
Newman Brothers, Inc., Cincinnati, O. Perkinson & Brown, Chicago, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Syracuse Fire Door Corp., Syracuse, N. Y. Van Noorden Co., E., Boston, Mass.

#### DOORS AND SHUTTERS, FIRE

DOORS AND SHUTTERS, FIRE

American Sheet Metal Works, New Orleans, La.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Cornell Iron Works, Inc., Long Island City, N. Y.
Detroit Steel Products Co., Detroit.
Dusing & Hunt, Inc., Buffalo.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Door Co., Inc., New York City.
Falstrom Co., Passaic, N. J.
Herrmann & Grace Co., Brooklyn, N. Y.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Steel Co., Evansville, Ind.
Kinnear Mfg. Co., Columbus, O.
Mahon Co., R. C., Detroit, Mich.
Maysteel Products, Inc., Mayville, Wis.
Merchant & Evans Co., Philadelphia, Pa.
Mesker & Co., Geo. L., Evansville, Ind.
Perkinson & Brown, Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Saino Mfg. Co., Inc., F. L., Memphis, Tenn.
Schoedinger, F. O., Co., Columbus, O.
Syracuse Fire Door Corp., Syracuse, N. Y.
Van Noorden Co., E., Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.

• Willis Mfg. Co., Galesburg, Ill.

#### DRAFT GAGES See Gages, Draft

DRAFT REGULATORS See Regulators, Furnace Draft, Mechanical

#### DRILLS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., New York City.
Cincinnati Electrical Tool Co., Cincinnati, O.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
Independent Pneumatic Tool Co., Chicago, Ill.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Power King Tool Corp., Warsaw, Ind.
Signal Electric Mfg. Co., Menominee, Mich.

Skilsaw, Inc., Chicago.
Snap-On Tools Corp., Kenosha, Wis.
Speedway Mfg. Co., Cicero, Ill.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
United States Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
Willy's Carbide Tool Company, Detroit.
Wodack Electric Tool Corp., Chicago, Ill. (Combination hammer and drill)

hammer and drill)

#### DUCTS AND DUCT FITTINGS, PREFABRICATED

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate and Roofing Supply Co., Philadelphia, Pa.
Adelta Manufacturing Co., Philadelphia.
Carey Co., Philip, Cincinnati, O.
Champion Furnace Pipe Co., Peoria, Ill.

Char-Gale Mig. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.

Excelsior Steel Furnace Co., Chicago, Ill.

Henry Furnace & Foundry Co., Cleveland, O.
Howes Co., S. M., Charlestown, Boston.

Lamneck Products, Inc., Middletown, Ohio.

Meyer & Bro. Co., F., Peoria, Ill.

Milcor Steel Co., Milwaukee, Wis.
Moncrief Furnace Co., Atlanta, Ga.

Mueller Furnace Co., L. J., Milwaukee.
Richmond Radiator Co., Inc., Uniontown, Pa.
Season-Aire Corporation of America, Detroit.

Ounited States Register Co., Battle Creek, Mich.

#### EAVES TROUGH FITTINGS AND ACCESSORIES See Fittings and Accessories, Eaves Trough and Gutter

#### EAVES TROUGH AND GUTTERS

EAVES TROUGH AND GUTTERS

American Sheet Metal Works, New Orleans, La. Ames Co., W. R., San Francisco, Cal. Anderson Mfg. Co., Des Moines, Ia. Barnes Metal Products Co., Chicago, Ill. Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.

Berger Bros. Co., Philadelphia, Pa. Berger Mfg. Div. of Republic Steel Corp., Canton, O. Biersach & Niedermeyer Company, Milwaukee. Braden Mfg. Co., Terre Haute, Ind. Bridesburg Foundry Co., Philadelphia, Pa. California Cornice, Steel & Supply Corp., Los Angeles. Chase Brass & Copper Co., Inc., Waterbury, Conn. Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O. Downs-Smith Brass & Copper Co., New York City. Edwards Mfg. Co., Inc., Cincinnati, O. Herbert & Sons, T. L., Nashville, Tenn.

Hussey & Co., C. G., Pittsburgh, Pa.

Klauer Mfg. Co., Dubuque, Ia.

La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis. Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Long Island City, N. Y. Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.

Martin Metal Mfg. Co., Wichita, Kan.

Millor Steel Co., Milwaukee, Wis. (Square Hanging)

Miller & Doing, Inc., Brooklyn, N. Y.

Newport Rolling Mill Co., Newport, Ky.

Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.

Northern Furnace & Supply Company, Billings, Mont.

Ocborn Co., J. M. & L. A., Cleveland, O.

Reeves Steel & Mfg. Co., Dover, O.

Republic Steel Corporation, Cleveland.

Ryniker Sheet Metal Works, Inc., Billings, Mont.

St. Paul Corrugating Co., St. Paul, Minn.

Schoedinger, F. O., Co., Columbus, O.

Sheet Metal Products Co., Peoria, Ill.

Southern States Iron Roofing Co., Savannah, Ga.

Tiffin Art Metal Co., Tiffin, O.

Van Noorden Co., E., Boston, Mass.

Wheeling Metal & Mfg. Co., Meeling, W. Va.

Williams-Wallace Co., San Francisco.

Willis Mfg. Co., Galesburg, Ill.

Woolwine Metal Products Co., Los Angeles, Cal.

York Corrugating Co., York, P...

#### ELBOWS, BLOW PIPE See Fittings, Blow Pipe

ELBOWS, CONDUCTOR See Fittings and Accessories, Conductor

ELBOWS, FURNACE PIPE See Fittings and Accessories, Furnace Pipe

● Advertisement in this issue. See Index to Advertisers, page 304

#### ELECTRIC WELDERS See Welders, Arc, Spot

#### ELECTRODES, ARC WELDING

Air Reduction Sales Company, New York City.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Company of America, Pittsburgh.
American Agile Corporation, Cleveland.

•American Brass Co., Waterbury, Conn.
Arcos Corp., Philadelphia, Pa.
Bastian Blessing Co., Chicago.
Chicago Steel & Wire Company, Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee.
Hobart Brothers Company, Troy, Ohio.

•Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., York, Pa.
Metal & Thermit Corp., New York City.
Page Steel & Wire Div., of American Chain & Cable Co., Inc.,
Monessen, Pa.
Revere Copper and Brass Incorporated, New York City.
Roebling's Sons Co., John A., Trenton, N. J.

Roebling's Sons Co., John A., Trenton, N. J. Seneca Wire & Mfg. Co., Fostoria, O. Torchweld Equipment Div., National Cylinder Gas Co.,

Chicago, Ill.
Una Welding, Inc., Cleveland.
Universal Power Corporation, Cleveland.
Westinghouse Electric & Mfg. Co., East Pittsburgh.
Wilson Welder & Metals Co., Inc., New York City.

#### **ENAMELS & LACQUERS**

Baer Brothers, New York City.
Debevoise Co., Brooklyn, N. Y.
Dragert Company, C. H., Inc., Brooklyn, N. Y.
duPont de Nemours & Co., E. I., Wilmington, Del.
Ferro Enamel Corporation, Cleveland.
Ford Roofing Products Co., Chicago.
Glidden Co., The, Cleveland.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Krehbiel Co., J. H., Chicago.
Maas & Waldstein Co., Newark, N. J.
O'Brien Varnish Co., South Bend, Ind.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Thompson & Co., Pittsburgh, Pa.
Walles Dove-Hermiston Corp., Westfield, N. J.
Wilhelm Co., A., Reading, Pa.
Zapon-Brevolite Division Atlas Powder Co., North Chicago,
Ill.

#### FACES, COLD AIR, WOOD

American Wood Register Co., Plymouth, Ind.
Antigo Bldg. Supply Co., Antigo, Wis.
Garber Lumber & Construction Co., Strasburgh, O.
Lockjoint Wood Products Co., Wichita, Kans.

Marsh Lumber Co., Inc., Dover, O.
McClure Builders' Supply Co., E. Palestine, O.
Wooster Art Wood, Inc., Wooster, O.

#### FAN-FILTER UNITS, PROPELLER (Separate conversion unit for warm air furnaces)

Air Controls, Inc., Cleveland, O.
Henry Furnace & Foundry Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Utility Fan Corporation, Los Angeles.
Wayne Automatic Relay Co., Fort Wayne, Ind.

#### FANS, BOOSTER, COLD AIR RETURN

•A-C Mfg. Co., Pontiac, Ill.
Advance Aluminum Castings Corp., Chicago, Ill.
Alre-Foile Fan & Blower Company, Detroit, Mich.
Autovent Fan Co., Piqua, O.
Brumme Mfg. Co., Chicago, Ill.
Brundage Co., Kalamazoo, Mich.
Cary Mfg. Co., Waupaca, Wis.
Economy Electric Mfg. Co., Cicero, Ill.
Forct-Air Co., Rockford, Ill.
General Blower Co., Philadelphia.
General Regulator Corp., Chicago, Ill.
International Engineering, Inc., Dayton, O.

Mauer Engineering, Evanston, Ill.

Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.

Propellair, Inc., Springfield, O.
Roan Mfg. Co., Racine, Wis.
Universal Blower Co., Birmingham, Mich.

#### FANS, BOOSTER, ONE-PIPE WARM AIR

Advance Aluminum Castings Corp., Chicago.
Aire-Foile Fan & Blower Co., Detroit, Mich.

•American Foundry & Furnace Co., Bloomington, Ill.
Brundage Co., Chicago, Ill.
Brundage Co., Kalamazoo, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
Forct-Air Co., Rockford, Ill.
General Regulator Corp., Chicago.
Kisco Company, Inc., St. Louis.

•Mauer Engineering, Evanston, Ill.
Meler Electric & Machine Co., Indianapolis, Ind.
Midwestern Supply Co., Chicago.

•Mueller Furnace Co., L. J., Milwaukee.
Universal Blower Co., Birmingham, Mich.

•Victor Electric Products, Inc., Cincinnati, O.

#### FANS, FURNACE, PROPELLER TYPE (Complete with mounting for installation in cold air return)

•Air Controls, Inc., Cleveland, O.

Autovent Fan & Blower Co., Chicago, Ill.

Belanger Fan & Blower Co., Detroit.

De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.

Economy Electric Manufacturing Co., Cicero, Ill.

Forct-Air Co., Rockford, Ill.

General Aire Company, Philadelphia.

General Regulator Corp., Chicago, Ill.

Henry Furnace & Foundry Co., Cleveland, O.

Hudson-Root Company, Brocton, N. Y.

International Engineering, Inc., Dayton, O.

Meier Electric & Machine Co., Indianapolis, Ind.

Peerless Electric Co., Warren, O.

Propellair, Inc., Springfield, O.

#### FANS, KITCHEN EXHAUST

FANS, KITCHEN EXHAUST

Aire-Folle Fan & Blower Co., Detroit, Mich. Airmaster Corp., Chicago, Ill.
Airtherm Mfg. Co., St. Louis.

Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Blower Corp., Jacksonville, Fla.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Belanger Fan & Blower Co., Detroit.
Berns Specialty Co., Chicago, Ill.
Birmingham Fan Mfg. Co., Birmingham, Ala.

Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators and Devices Mfg. Corp., New York City.
Circulators and Devices Mfg. Corp., New York City.
Circulators and Devices Mfg. Corp., New York City.
Clarage Fan Co., Kalamasoo, Mich.
Dallas Engineering Co., Inc., Dallas, Tex.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Corp., Detroit, Mich.
Electrovent Fan & Mfg. Co., Chicago, Ill.

Electrovent Fan & Mfg. Co., Chicago, Ill.
Gas City Glass Co., Gas City, Ind.
General Aire Company, Philadelphia, Pa.
General Blower Co., Philadelphia, Pa.
General Regulator Corp., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Ilg Electric Co., Burney, Inc., Dayton, O.
King Ventilating Co., Cwatonna, Minn.
Lohman, Inc., Wm. J., New York City.
Marathon Electric Mfg. Co., Phitago, Ill.
Peerless Electric Co., Pittsburgh, Pa.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Pittsburgh, Pa.
New York Blower Co., Chicago, Ill.
Seed Unit-Fans, Inc., Dspringfield, O.
Pryne & Co., Inc., Los Angeles, Cal.
Reed Unit-Fans, Inc., Springfield, O.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Shreveport Engineering Co., Inc., Shreveport, La.
Signal Electric Mfg. Co., Menominee, Mich.
Skinner He

#### FANS, NIGHT AIR COOLING, COMPLETE UNIT

\*\*FANS, NIGHT AIR COOLING, COMPLETE UNIT\*

\*\*Air Controls, Inc., Cleveland, O. Aire-Foile Fan & Blower Co., Detroit, Mich. Airmaster Corp., Chicago, Ill.

\*\*Ailen Corporation, Detroit, Mich. American Blower Corp., Jacksonville, Fla. Associated Southern Industries, Memphis, Tenn. Autovent Fan & Blower Co., Detroit, Mich. Belico Exhaust Fan Mar Co., St. Louis. Belanger Fan & Blower Co., Detroit, Mich. Belico Exhaust Fan Mar Co., St. Louis. Bryant Heater Co. Cleveland. Buffalo Forge Co., Buffalo, N. Y. Chelsea Fan & Blower Co., Inc., New York City. Circulators & Devices Mar Corp., New York City. Circulators & Devices Mar Corp., New York City. Circulators & Devices Mar Corp., New York City. Dallas Englineering Co., Inc., Dallas, Tex. DeBothezat Ventilating Eq. Div., American Machine & Metals, Inc., East Moline, Illinois. Diehl Mar. Co., Elizabethport, N. J. Economy Electric Mar. Co., Circusago, Ill. Electrovent Fan & Mar. Co., Chicago, General Aire Company, Philadelphia, Pa. General Blower Co., Philadelphia, Pa. General Blower Co., Philadelphia, Pa. General Hower Co., Chicago, Ill. Governair Corporation, Oklahoma City, Okla. Haill Manufacturing Co., Cedar Rapids, Iowa. Hartzell Propeller Fan Co., Piqua, O. Herbert & Son, T. L., Nashville, Tenn. Hirschman Co., Inc., W. F., Buffalo, N. Y. Hunter Fan & Ventilating Co., Chicago, Ill. International Engineering, Inc., Daylon, O. Jaden Manufacturing Co., F., Hastings, Nebr. Jamieson Mar. Co., Dallas, Tex.
New York Blower Co., Daylon, O. Lohman, Inc., William J., New York City. Manker Products Co., Inc., Memphis, Tenn. Marshno Electric & Machine Co., Indianapolis, Ind. Kelly Mar. Co., Ber. L., Indip. Ohicago, Ill. Jordan & Co., Paul R., Louis, Dollas, Ind. Kelly Mar. Co., Ber. H., Louis, Co., Louis, Edwirth, Co., Ber. H., Harts, Co., Del

FANS, VENTILATING, PROPELLER TYPE

(Capacity 4,000 c.f.m. up)

Aerovent Fan Co., Piqua, O.

Air Controls Inc., Cleveland, O.
Aire-Folie Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ili.
Airtherm Manufacturing Co., St. Louis, Mo.

Alco Manufacturing Co., Houston, Tex.

Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Blower Corp., Jacksonville, Fla.
Arex Co., Chicago, Ili.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Bayley Blower Co., Milwaukee, Wis.
Belanger Fan & Blower Co., Detroit, Mich.
Belco Exhaust Fan Mfg. Co., St. Louis.

Bishop & Babcock Mfg. Co., Cleveland, O.

Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators & Devices Mfg. Corp., New York City.
Circulators & Devices Mfg. Corp., New York City.
Clarage Fan Co., Kalamazoo, Mich.
Dallas Eng. Co., Inc., Dallas, Tex.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Esko Mfg. Corp., Houston, Tex.
Forct-Air Co., Rockford, Ill.
Fresh'nd-Aire Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
Gas City Glass Co., Gas City, Ind.
General Aire Company, Philadelphia,
General Blower Co., Philadelphia, Pa.
General Electric Co., Bloomfield, N. J.
General Regulator Corp., Chicago, Ill.
Governair Corporation, Oklahoma City, Okla.
Grand Rapids Blow Piper and Dust Arrester Co., Grand
Rapids, Mich.
Hall Mfg. Co., Cedar Rapids, Ia.

General Electric Co., Bloomfield, N. J.
General Regulator Corp., Chicago, Ill.
Governair Corporation, Oklahoma City, Okla.
Grand Rapids Blow Pipe- and Dust Arrester Co., Grand Rapids, Mich.
Hall Mfg. Co., Cedar Rapids, Ia.
Hartzell Propeller Fan Co., Piqua, O.
Herbert & Sons, T. L., Nashville, Tenn.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
Hunter Fan & Ventilating Co., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Johnston & Co., Wm. W., Dayton, O.
Jordan & Co., Paul R., Indianapolis, Ind.
King Ventilating Co., Owatonna, Minn.
Kisco Company, Inc., St. Louis, Mo.

Lau Blower Co., Dayton, O.
Lohman, Inc., Wm. J., New York City.
Manker Products Company, Inc., Memphis, Tenn.
Marathon Electric Mfg. Corp., Wausau, Wis.
Meier Electric & Machine Co., Indianapolis, Ind.
Mourtson Products, Inc., Cleveland.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Pittsburgh, Pa.
New York Blower Co., Chicago, Ill.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Propellair, Inc., Springfield, O.
Red Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Company, Chicago.
Robbins & Myers, Inc., Springfield, Ohlo.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Schwitzer-Cummins Co., Indianapolis, Ind.
Shreveport Engineering Co., Inc., Shreveport, La.
Signal Electric Mfg. Co., Menominee, Mich.
Skinner Heating & Ventilating, Co., Heater Div. of St.
Louis Blow Pipe & Heater Co., Inc., St. Louis.
Snoair Company, Dallas, Texas.
South Bend Air Products, Inc., South Bend, Ind.
Steamaire Co., Cincinnati, Ohio.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Truffo Fan Co., Harmony, Pa.

U. S. Air Conditioning Corp., Minneapolis, Minn.

U. S. Machine Corporation, Los Angeles, Cal.

Victor Electric Products, Inc., Cincinnati, O.

Viking Air Conditioning Corp., Cleveland, O.

W

#### FANS, WINDOW VENTILATING

Airmaster Corp., Chicago.

• Alco Manufacturing Co., Houston, Tex.
American Coolair Corp., Jacksonville, Fla. American Coolair Corp., Jacksonville, Fla.
American Coolair Corp., Jacksonville, Fla.
Arex Company, Chicago.
Autovent Fan & Blower Co., Chicago.
Buffalo Forge Co., Buffalo, N. Y.
Chelsea Fan & Blower Co., Inc., New York City.
Dallas Engineering Co., Inc., Dallas, Tex.
Diehl Mfg. Company, Elizabethport, N. J.
Esko Manufacturing Corp., Houston, Tex.
Essick Manufacturing Corp., Los Angeles.
Fresh'nd-Aire Company, Chicago.
General Aire Company, Philadelphia.
General Blower Company, Philadelphia.
General Regulator Corp., Chicago.
Hall Manufacturing Co., Cedar Rapids, Iowa.
Lohman, Inc., Wm. J., New York City.
Reed Unit-Fans, Inc., New Orleans, La.
Robbins & Myers, Inc., Springfield, Ohio.
Roto-Beam Div., Peerless of America, Inc., Chicago.
Snoair Company, Dallas, Texas.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.

Blow

1941

Viking Air Conditioning Corporation, Cleveland.
 Wagner Electric Corporation, St. Louis.
 Ward Co., Inc., Edgar T., River Forest, Ill.
 Ward Mfg. Co., Detroit.

#### FASTENINGS, SPRING STEEL

Tinnerman Products, Inc., Cleveland.

#### FILTERS, AIR, AUTOMATIC

Air Stream Filter Corp., St. Louis. Air Stream Filter Corp., St. Louis.
Air & Refrigeration Corp., New York City.

• American Air Filter Co., Inc., Louisville, Ky.

• Brauer Supply Co., A. G., St. Louis.
Coppus Engineering Corp., Worcester, Mass.
Dracco Corp., Cleveland, O.
Staynew Filter Corp., Rochester, N. Y.
Westinghouse Electric & Mfg. Co., Cleveland. (Electrostatic Precipitator)

#### FILTERS, AIR, UNIT, CLEANABLE

•Air Maze Corp., Cleveland, O.
Air Stream Filter Corp., St. Louis.
•American Air Filter Co., Inc., Louisville, Ky.
•American Foundry & Furnace Co., Bloomington, Ill.
Amirton Co., Inc., Elmsford, N. Y.
Annis Air Filters, Glendale, Cal.
•Brauer Supply Co., A. G., St. Louis.
Chicago Filter Co., Joliet, Ill.
Coppus Engineering Corp., Worcester, Mass.
Davies Air Filter Corp., New York, N. Y.
Hugo Mfg. Co., West Duluth, Minn.
Kauffman Air Conditioning Corp., St. Louis.
Kleenaire Corp., Stevens Point, Wis.
Kraissl Co., Inc., Hackensack, N. J.
Somers, Inc., H. J., Detrolt, Mich. (Hair, Glass)
Staynew Filter Corp. Rochester, N. Y.
Supreme Air Filter Co., New York City.
Tuttle Air Filter Co., Inc., Louisville, Ky.
Universal Air Filter Corp., Duluth, Minn.

#### FILTERS, AIR, UNIT, THROWAWAY

•American Air Filter Co., Inc., Louisville, Ky.
Amirton Co., Inc., Elmsford, N. Y.
Anderson Products, Inc., Cambridge, Mass.
Blocksom & Company, Michigan City, Ind.
Chicago Filter Co., Jollet, Ill.
Davies Air Filter Corp., New York City.
•Detroit Lubricator Co., Detroit.
Gehri Company, Tacoma, Wash. (Viscous)
Kleenaire Corp., Stevens Point, Wis.
Owens-Corning Fiberglas Corp., Toledo, O.
Plymouth Cordage Co., N. Plymouth, Mass. (Anderson Products, Inc., Cambridge, Mass., National Sales Agents)
•Research Products Corp., Madison, Wis.
Staynew Filter Corp., Rochester, N. Y.
Universal Air Filter Corp., Duluth, Minn.
Wilson & Co., Chicago, Ill.

#### FIRE BRICK See Refractories

#### FITTINGS AND ACCESSORIES, CONDUCTOR

(Elbows, Heads, Hooks, Shoes, Straps, etc.)

Allred Manufacturing Co., Inc., Indianapolis, Ind.

Allred Manufacturing Co., Inc., Indianapolis, Ind.
Ames Co., W. R., San Francisco.
Barnes Metal Products Co., Chicago, Ill.

Berger Bros. Co., Philadelphia, Pa.
Berger Mfg., Div. of Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Crary Mfg. Co., Middleport, O. (Cut-off.)
Dieckmann Co., Ferdinand, Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Hussey & Co., C. G., Pittsburgh, Pa.
Iwan Bros., South Bend, Ind.
Jeliff Mfg. Corp., C. O., Southport, Conn.

Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.

Levow, David, New York City.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
Maysteel Products, Inc., Mayville, Wis.

Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.

Osborn Co., J. M. & L. A., Cleveland, O. Rival Strap Corp., New York City. (Ornamental Conductor Straps)
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
Schoedinger Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Stewart Foundry, O. S., Cleveland, O. (Iron Conductor Shoes)
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.
Williams-Wallace Co., San Francisco.

Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal. Straps)

#### FITTINGS AND ACCESSORIES, EAVES TROUGH AND GUTTER

(Hangers, Strainers, Miters, Ends, Thimbles, etc.)

Abbott Mfg. Co., Painesy, Mies, Edg., Immoles, etc.)

Ames Co., W. R., San Francisco.

Barnes Metal Products Co., Chicago, Ill.

Berger Bros. Co., Philadelphia, Pa.

Berger Mfg., Div. of Republic Steel Corp., Canton, O.

Bertram Mfg. Co., Chicago, Ill.

Byd & Co., Inc., Charles P., Philadelphia.

Braden Mfg. Co., Terre Haute, Ind.

Chase Brass & Copper Co., Inc., Waterbury, Conn.

Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Downs-Smith Brass & Copper Co., New York City.

Eav-Tex Company, Upper Darby, Pa. (Roof Gutter Protection)

tection)

Eav-Tex Company, Upper Darby, Pa. (Roof Gutter Protection)

Edwards Mfg. Co., Inc., Cincinnati, O.
Grand Rapids Wire Products Co., Grand Rapids, Mich.
Herbert & Sons, T. L., Nashville, Tenn.

Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Iwan Brothers, South Bend, Ind.

Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Long Island City, N. Y.

Levow, David, New York City.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Ohio Wire Products Co., Dover, O. (Hangers)

Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.
Right-Way Shield Co., Toledo. (Eaves Trough Shield)
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
St. Paul Corrugating Co., St. Paul, Minn.
Sheet Metal Products Co., Peoria, Ill.
Snap-On Mfg. Co., Chicago, Ill. (Hangers)
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
U. S. Cistern Filter Mfg. Co., Bloomington, Ill.
Wheeling Corrugating Co., San Francisco.

Williams-Wallace Co., San Francisco.

Williams-Wallace Co., San Francisco.

#### FITTINGS AND ACCESSORIES, FURNACE PIPE (Angles, Boots, Elbows, Heads, Joints, Offsets, Tees, etc.)

(Angles, Boots, Elbows, Heads, Joints, Offsets, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Adelta Manufacturing Co., Philadelphia.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bergstrom Mfg. Corp., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stampings Co., Canonsburg, Pa.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Stamping Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.
Detroit Safety Furnace Pipe Co., Detroit, Mich.

Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Steve & Mfg. Co., Quincy, Ill.
Farquhar Furnace Co., Wilmington, O.
Fraser and Johnston Co., San Francisco.
Green Colonial Furnace Co., Des Moines, Ia.

Henry Furnace & Foundry Co., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.

Homer Furnace & Foundry Corp., Coldwater, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.

International Heater Co., Utica, N. Y.
Keith Furnace Company, Des Moines, Iowa.

Index to Advertisers, page 304

La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.

JD

ro-

Vis.

Cal.

1941

La Crosse Steel Roofing & Corrugating Co., La Crosse, W. (Elbows and pipe only.)

Lamneck Products, Inc., Middletown, Ohio.
Lee Furnace Co., South Bend, Ind.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.

Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
Martin Metal Mfg. Co., Wichita, Kan.

Meyer & Bro. Co., F., Peoria, Ill.

Milcor Steel Co., Milwaukee, Wis.
Monarch Furnace Fittings Manufacturers, Chicago, Ill.
Montag Stove & Furnace Works, Portland, Ore.

Mueller Furnace Co., L. J., Milwaukee, Wis.
Osborn Co., J. M. & L. A., Cleveland, O.

Pacific Gas Radiator Co., Huntington Park, Cal.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.

Payne Furnace & Supply Co., Beverly Hills, Cal.
Perelless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.

Premier Furnace Company, Dowagiac, Mich.
Ramey Mfg. Co., Columbus, O.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.

Rock Island Register Co., Rock Island, Ill.
Schecter Brothers Co., Philadelphia, Pa.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.

United States Register Co., Battle Creek, Mich.

Waterman-Waterbury Co., Minneapolis.
Waverly Heating Supply Co., Boston.
Wheeling Corrugating Co., Wheeling, W. Va.

#### FITTINGS AND ACCESSORIES, SMOKE PIPE (Draw-bands, Clean-outs, Collars, Tees, etc.)

FITTINGS AND ACCESSORIES, SMOKE PIPE

(Draw-bands, Clean-outs, Collars, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philladelphia, Pa.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Bergstrom Mfg. Corp., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.

Brauer Supply Co., A. G., St. Louis, Mo.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peorla, Ill.
Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Steet Metal & Roofing Co., Cincinnati, O.
Cincinnati Steet Metal & Roofing Co., Cincinnati, O.
Cincinnati Steet Furnace Pipe Co., Detroit, Mich.

Excelsior Steel Furnace Co., Des Molnes, Ia.

Henry Furnace & Foundry Co., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.

Homer Furnace & Foundry Corporation, Coldwater, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.

International Heater Co., Utica, N. Y.
Keith Furnace Company, Des Moines, Ia.
Kirk & Blum Mfg. Co., Cincinnati, Ohlo.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.

Lamneck Products, Inc., Columbus, Ohio.

Lee Furnace Co., South Bend, Ind.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.

Majestic Co., Huntington, Ind.

Marshall Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Milwaukee, Wis.

Montag Stove & Furnace Works, Portland, Ore.

Mueller Furnace Co., L. J., Milwaukee, Wis.

Montag Stove & Furnace Works, Portland, Ore.

Mueller Furnace Co., Inc., Baltimore, Md.

Majestic Co., J. V., Sycamore, Ill.

Peacard Co., M. A., Boston.

Peerless Foundry Co., Clumbus, Ohio.

Reeves Steel & Mfg. Co., Columbus, Ohio.

Renter Heating & Ventilation Co., Minneapolis, Minn.

Tiffin Art Metal Co., Tiffin, O.

United S

Wilder Manufacturing Co., Niles, O.

• Williamson Heater Co., Cincinnati, O.

Wilson Building Materials Co., Cincinnati, Ohio. • Wise Furnace Co., Akron, O.

#### FITTINGS, BLOW PIPE (Elbows, Flanges, Hangers, Hoods and Sweeps, Joints, Rings, Tubing)

Acer & Whedon, Inc., Medina, N. Y.
Airtherm Mfg. Co., St. Louis, Mo.
Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Day Co., Minneapolis, Minn.
Falstrom Co., Passaic, N. J.
Goethel Co., Alfred C., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids. Mich. ids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O. (Adjustable Buffing Hoods) Lee & Son Co., Thomas, Cincinnati, O. Lee & Son Co., Thomas, Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Meyer & Bro. Co., F., Peoria, Ill.
Puhl & Hepper Mfg. Co., Inc., St. Louis.
Schmieg Sheet Metal Works, Detroit.
Skinner Heating & Vent. Co., Heater Div. of St. Louis
Blow Pipe & Heater Co., Inc., St. Louis.
Tiffin Art Metal Co., Tiffin, Ohio.
United States Register Co., Battle Creek, Mich.
Western Blower Co., Seattle, Wash.
Young & Bertke Co., Cincinnati, O.

#### FITTINGS, HUMIDIFIER, WATER LINE

◆American Brass Co., Waterbury, Conn.
Bishop Humidifier Co., Detroit, Mich.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Hays Mfg. Co., Erie, Pa.
◆McDonnell & Miller, Chicago.
◆Maid-O'-Mist, Inc., Chicago, Ill.
◆Monmouth Products Co., Cleveland, O.
Reichert Float & Mfg. Co., Toledo, O.
•Rockford Brass Works, Rockford, Ill.
Sallada Mfg. Co., Minneapolis, Minn.
•Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
•Skuttle Co., J. L., Detroit, Mich.
Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.
Weatherhead Co., Cleveland, O.

#### **FLANGERS**

See Machines, Flanging

## FLANGES, BLOW PIPE

See Fittings, Blow Pipe

#### FLASHINGS, ROOF, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.

American Rolling Mill Co., Middletown, Ohio.
Barber Asphalt Corporation, Barber, N. J.
Barrett Co., New York City (for brick and concrete)
Berger Mfg. Div. Republic Steel Co., Canton, Ohio.
Biersach & Niedermeyer Co., Milwaukee.
Byers Flashing Sales Division, Chicago.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Cheney Co., Philadelphia.
Chicago Metal Mfg. Co., Chicago, Ill.
Cox Roofing Co., Winston-Salem, N. C.
Downs-Smith Brass & Copper Co., New York City.
Eagle-Picher Lead Co., Cincinnati, O.
Edwards Mfg. Co., Linc., Cincinnati, O.
Figge Mfg. Co., Chicago, Ill.
Flamm Lead Company, Inc., Long Island City, N. Y.

Hussey & Co., C. G., Pittsburgh, Pa.
Majestic Flashing Company, Baltimore.
Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee, Wis.
Revere Copper and Brass Incorporated, New York City.
Robertson Co., H. H., Pittsburgh, Pa.
Rochester Lead Works, Inc., Rochester, N. Y.
Schoedinger, F. O., Columbus, O.

Simplex Manufacturing Co., Fond du Lac, Wis.
ThruBond Flashing Corp., New York City.
Van Noorden Co., E., Boston, Mass.
Williams-Wallace Co., San Francisco.

Willis Mfg. Co., Galesburg, Ill. (Copper)
York Corrugating Co., York, Pa.

#### FLASHINGS, THROUGH-WALL, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.

• American Brass Co., Waterbury, Conn. (Copper)

Barber Asphalt Corporation, Barber, N. J.
Biersach & Niedermeyer Company, Milwaukee.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Cheney Co., Philadelphia, Pa. (Copper)
Downs-Smith Brass & Copper Co., Inc., New York City. Figge Mfg. Co., Chicago. Figge Mfg. Co., Chicago.

Majestic Flashing Company, Baltimore.

Revere Copper and Brass Incorporated, New York City.

Robertson Co., H. H., Pittsburgh, Pa.

ThruBond Flashing Corp., New York City.

Van Noorden Co., E., Boston.

Willis Mfg. Co., Galesburg, Ill. (Galvanized & copper)

FLASHINGS, WALL, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Barber Asphalt Corporation, Barber, N. J.
Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.
Biersach & Niedermeyer Company, Milwaukee. Biersach & Niedermeyer Company, Milwaukee.
Cheney Co., Philadelphia, Pa.
Figge Mfg. Co., Chicago.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Majestic Flashing Company, Baltimore.

Milcor Steel Co., Milwaukee, Wis.
Revere Copper and Brass Incorporated, New York City.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Van Noorden Co., E., Boston.

Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

**FLUE GAS ANALYZERS** 

See Analyzers, CO2, Portable

#### FLUX, SOLDERING

FLUX, SOLDERING

Air Reduction Sales Company, New York City. (Aluminum)

Allen Co., L. B., Chicago (Aluminum, Copper, Galv. Iron, Stainless Steel)

American Chemical Paint Co., Ambler, Pa.

American Solder & Flux Co., Philadelphia, Pa.

Automatic Gasfiux Mfg. Co., Mansfield, Ohio.

Bastian Blessing Co., Chicago.

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.

Benson Co., Inc., Alex R., Hudson, N. Y. (Salts, Pastes)

Burnley Battery & Mfg. Co., North East, Pa. (Paste, Salts, Solution) (Copper, Galvanized Iron)

Colonial Alloys Company, Philadelphia.

Diener Mfg. Co., Geo. W., Chicago, Ill.

du Pont de Nemours & Co., E. I., Wilmington, Del.

Gardiner Metal Co., Chicago, Ill.

General Electric Co., Schenectady, N. Y.

Handy & Harmon, New York City.

Hercules Chemical Co., Inc., New York City.

Imperial Brass Mfg. Co., Chicago, Ill.

Johnson Co., Lloyd S., Chicago. (Aluminum, stainless steel, copper, galvanized iron)

Johnson Gas Appliance Co., Cedar Rapids, Iowa.

Kester Solder Co., Chicago, Ill.

Langsenkamp Co., F. H., Indianapolis, Ind. (Stainless Steel)

Lukens Metal Co., Thos. F., Philadelphia, Pa. (Copper, Galvanized Iron, Stainless Steel)

McNamee Products, Glencoe, Ill.

Milburn Co., Alexander, Baltimore, Md.

Motex Metal Process Corporation, Detroit.

Pfanstiehl Chemical Co., Waukegan, Ill.

Potomac Mfg. Co., Philadelphia, Pa.

Ruby Chemical Co., Columbus, O. (Liquid and Paste)

Sight Feed Generator Co., Richmond, Ind.

Torchweld Equipment Div. National Cylinder Gas Co., Chicago, Ill.

Woodhill Chemical Co., Cleveland.

#### FRAMING, FOR HOUSING ASSEMBLIES

Dry-Zero Corporation, Chicago.

**FURNACE BLOWERS** See Blowers, Furnace, Centrifugal

**FURNACE-BURNER UNITS** See Furnaces, Warm Air

**FURNACE COVERING** See Insulation, Furnace and Pipe

> **FURNACE LINING** See Refractories

#### **FURNACE PIPE**

See Pipe, Furnace

#### FURNACE PIPE FITTINGS AND ACCESSORIES

See Fittings and Accessories, Furnace Pipe

#### **FURNACE REGULATORS**

See Regulators, Furnace Draft, Mechanical and Motors, Damper, Furnace Draft, Electrical

#### **FURNACE REPAIRS**

See Repairs, Stove and Furnace

#### FURNACES, SOLDERING

Aeroil Burner Co., Inc., West New York, N. J.
Bernz Co., Inc., Otto, Rochester, N. Y.
Burgess Soldering Furnace Co., Columbus, O. (Gasoline)
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Hauck Mfg. Co., Brooklyn, N. Y.
Hones, Inc., Charles A., Baldwin, N. Y.
Insto-Gas Corporation, Detroit.

Johnson Gas Appliance Co., Cedar Rapids, Ia.
Liquefied Gas Appliance Co., Mars, Pa.
Reiner & Campbell, Inc., New York City.
Reliable Gas Products Co., Cedar Rapids, Ia.
Turner Brass Works, Sycamore, Ill.
Vulcan Electric Co., Lynn, Mass.

Weiss & Co., H., New York City.

## FURNACES, WARM AIR, AIR CONDITIONING, COAL, CAST IRON

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

Adelta Manufacturing Co., Philadelphia. Agricola Furnace Co., Inc., Gadsden, Ala.

Airtemp Div., Chrysler Corp., Dayton, Ohio.

American Foundry & Furnace Co., Bloomington, Ill. American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Andes Range & Furnace Corp. Geneva, N. Y. Bovee Furnace Works, Waterloo, Ia.

Chandler Co., Cedar Rapids, Ia.

Cleveland Steel Products Corp., Cleveland.

Des Moines Stove Repair Co., Des Moines, Ia.

Excelsior Steel Furnace Co. Chicago, Ill.

Faultless Heater Corp., Cleveland, O.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis. Gilt Edge Furnace & Mfg. Co., Milwaukee.

Green Colonial Furnace Co., Indianapolis, Ind.

Harl-Neal Furnace Co., Indianapolis, Ind.

Hart & Crouse Corp., Utica, N. Y.

Henry Furnace & Fdy. Co., Cleveland, O.

Homer Furnace Co., Massillon, O.

Homer Furnace Co., Holland, Mich.

Homer Furnace Co., Deroit, Mich.

Independence Stove & Furnace Co., Independence, Mo.

International Heater Co., Utica, N. Y.

Keith Furnace Co., Des Moines, Ia.

Keisey Heating Co., Inc., Syracuse, N. Y.

MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.

Marshall Furnace Co., Marshall, Mich.

May-Flebeger Co., Newark, O.

Meyer Furnace Co., Lu., Milwaukee, Wis.

Olsen Mfg. Co., C. A., Elyria, O.

Pittsburgh Furnace Co., Dowagiac, Mich.

Newler Furnace Co., Dowagiac, Mich.

Richardson & Boynton Co., New York City.

Robinson Furnace Co., Chicago, Ill.

Rock Island Stove Co., Rock Island, Ill.

Round Oak Co., Dowagiac, Mich.

Rybolt Heater Co., Ashland, O.

St. Louis Furnace Co., Ashland, O.

St. Louis Furnace Manufacturing Co., St. Louis, Mo. Schill Mfg. Co., Crestline, O.

Sloux City Foundry & Boiler Company, Sioux City, Ia.

Schill Mfg. Co., Crestline, O.
Sioux City Foundry & Boiler Company, Sioux City, Ia.

Twentieth Century Heating & Ventilating Co., Akron, O.
Western Furnaces, Inc., Tacoma, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Williamson Heater Co., Cincinnati, O.
Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, AIR CONDITIONING, COAL, STEEL

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

humidifier unit)

Adelta Manufacturing Co., Philadelphia.

Airtemp Div., Chrysler Corp., Dayton, Ohio.

American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis.
American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York
City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee, Wis.
Andrews Heating Co., Minneapolis.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.

Beck Engineering Combustion Kompany, St. Louis.
Bovee Furnace Works, Waterloo, Ia.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.

Chandler Co., Cedar Rapids, Ia.
Cleveland Steel Products Products Corp., Cleveland.
Des Moines Stove Repair Co., Des Moines, Ia.
Dowagiac Steel Furnace Co. Chicago, Ill.
Farquhar Furnace Co., Wilmington, O.
Faultless Heater Corp., Cleveland.
Forest City Foundries Co., Cleveland, O.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gascol Furnace Co., The, Pittsburgh. (Combination Coal and Gas)
Gilt Edge Furnace & Mfg. Co., Milwaukee.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis. Gascol Furnace Co., The, Pittsburgh. (Combination Coal and Gas)
Glit Edge Furnace & Mfg. Co., Milwaukee.
Green Colonial Furnace Co., Des Moines, Ia.
Grossenbacher Furnace Co., St. Louis, Mo.
Hall-Neal Furnace S., Inc., Tacoma, Wash.
Henry Furnace & Fdy. Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Hess Warming & Ventilating Co., Chicago, Ill.
Homer Furnace & Foundry Corp., Coldwater, Mich. Ideal Furnace Co., Detroit, Mich. Ingersoll Steel & Disc. Div., Borg-Warner Corp., Chicago.
International Heater Co., Utica, N. Y.
Jollet Heating Corp., Joliet, Ill.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Koons Furnace Co., Danville, Ill.
Lee Furnace Co., South Bend, Ind.
Lennox Furnace Co., Marshalltown, Ia.
McLouth Air Conditioning Corp., Lansing, Mich.
McPherson Furnace & Supply Co., Portland, Ore. (Also wood burning)
Maiestic Co., Huntington. Ind.

ork

uis.

III.

1941

Lennox Furnace Co., Marshalltown, Ia.
McLouth Air Conditioning Corp., Lansing, Mich.
McPherson Furnace & Supply Co., Portland, Ore. (Also wood burning)
Majestic Co., Huntington, Ind.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
Mayflower Air-Conditioners, Inc., St. Paul.
Meyer Furnace Co., Peoria, Ill.
Michigan Tank & Furnace Corp., Detroit, Mich.
Montag Stove & Furnace Works, Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit, Mich.
Northwest Stove Works, Portland, Ore.
Olsen Mfg. Co., C. A., Elyria, O.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Portland Stove Foundry Co., Portland, Me.
Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago.
Rosebraugh Co., W. W., Salem, Ore.
Round Oak Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, O.
St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Sandberg Sheet Metal Works, Portland, Ore.
Schill Mfg. Co., Crestline, O.
Skinner Heating & Vent. Co., Heater Div. of St. Louis
Blow Pipe & Heater Co., Inc., St. Louis.
Spencer Heater Division, Williamsport, Pa.
Standard Furnace & Supply Co., Omaha, Nebr.
Sure Comfort Furnace Co., Berwyn, Ill.
Waterman-Waterbury Co., Minneapolis, Minn.
Western Furnaces, Inc., Tacoma, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Williamson Heater Co., Akron, O.

## FURNACES, WARM AIR, AIR CONDITIONING, FOR ATTIC INSTALLATION, STEEL

American Furnace Co., St. Louis.

Gasconaire, Inc., Detroit (Gas)

Lennox Furnace Co., Marshalltown, Iowa, and Syracuse,
N. Y.

Payne Furnace & Supply Co., Beverly Hills, Cal. Stephens Mfg. Co., Tulsa, Okla.

#### FURNACES, WARM AIR, AIR CONDITIONING, GAS, CAST IRON

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

humidifier unit)

Adelta Manufacturing Co., Philadelphia.

Airtemp Division, Chrysler Corporation, Dayton, O.

American Feundry & Furnace Co., Bloomington, Ill.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Bastain-Morley Co., Inc., LaPorte, Ind.

Beck Engineering Combustion Kompany, St. Louis, Mo.

Bryant Heater Co., Cleveland.

Cleveland Steel Products Corp., Cleveland.

Forest City Foundries Co., Cleveland, O.

Glit Edge Furnace & Mfg. Co., Milwaukee.

Green Colonial Furnace Co., Des Moines, Ia.

Henry Furnace & Fdy. Co., Cleveland, O.

Hess-Snyder Co., Massillon, O.

Ideal Furnace Co., Detroit, Mich.

International Heater Co., Utica, N. Y.

Mueller Furnace Co., L. J., Milwaukee, Wis.

Olsen Mfg. Co., C. A., Elyrla, O.

Pacific Gas Radiator Co., Huntington Park, Cal.

Pennsylvania Furnace & Iron Co., Warren, Pa.

Premier Furnace Co., Dowagiac, Mich.

Richmond Radiator Co., Inc., Uniontown, Pa.

Rome Grader & Machinery Corp., Rome, N. Y.

Rudy Furnace Co., Dowagiac, Mich.

Rybolt Heater Co., Ashland, O.

Sloux City Foundry and Boller Company, Sloux City, Ia.

Surface Combustion Corp., Toledo, O.

Thatcher Furnace Co., Newark, N. J.

Twentieth Century Heating & Ventilating Co., Akron, O.

Vacuum Gas Appliance Div., Union Fork & Hoe Co., Rome, N. Y.

Westinghouse Electric & Mfg. Co., East Springfield, Mass.

N. Y.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
•XXth Century Heating & Ventilating Co., Akron, O.
•Wise Furnace Co., Akron, O.
York Ice Machinery Corp., York, Pa.

#### FURNACES, WARM AIR, AIR CONDITIONING, GAS, STEEL

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

Adelta Manufacturing Co., Philadelphia.

Airtemp Div., Chrysler Corp., Dayton, Ohio. Aladdin Heating & Air Conditioning Co., Lawndale, Cal. Allied Heating & Air Conditioning Co., Lawndale, Cal.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

American Standard Gas Products Co., Detroit. Andrews Heating Company, Minneapolis.

Armstrong Furnace Co., Columbus, O. Auburn Burner Co., Auburn, Ind.

Bard Mfg. Co., Bryan, O.

Beck Engineering Combustion Kompany, St. Louis, Mo. Bryant Corp., C. L., Cleveland, O. Campbell Heating Company, Des Moines, Ia.

Campbell Heating Company, Des Moines, Ia.

Campbell Heating Corp., Cedar Rapids, Ia.

Conco Corporation, Mendota, Ill.

Corozone Air Conditioning Corp., The, Cleveland, O. Dalzen Manufacturing Co., Detroit.

Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.

Dornback Furnace & Foundry Co., Cleveland.

Dunham Co., C. A., Chicago.

Electrogas Furnace Co., San Francisco, Cal.

Essick Manufacturing Co., Los Angeles.

Fitzgibbons Boiler Co., Inc., New York City.

Forest City Foundries Co., Cleveland.

Fraser and Johnston Co., 725 Potrero Ave., San Francisco.

Gascol Furnace Co., The, Pittsburgh (Combination Coal & Gas)

Gasconaire, Inc., Detroit, Mich.

Gaul Air Conditioner Co., Dayton, Ohio.

General Electric Company, Bloomfield, N. J.

Gillen Company, J. L., Dowagiac, Mich.

General Electric Company, Bloomfield, N. J.

Gillen Company, J. L., Dowagiac, Mich.

General Electric Company, Bloomfield, N. J.

Green Colonial Furnace Co., Indianapolis, Ind.

Heating Equipment Co., San Francisco.

Heatlox Furnaces. Inc., Tacoma. Wash

• Hall-Neal Furnace Co., Indianapolis, Ind. Heating Equipment Co., San Francisco. Heatlox Furnaces, Inc., Tacoma, Wash.

Heatlox Furnaces, Inc., Tacoma, Wasn.
Heil Co., The, Milwaukee.

Hess Warming & Ventilating Co., Chicago, Ill.
Huwer Heating Corp., Detroit.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., Chicago.
Johnston Gas Furnace Corp., North Hollywood, Cal.

Joliet Heating Corp., Joliet, Ill.
Kaustine Co., Inc., Perry, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kent Co., Inc., J. King, 6477 Manchester Ave., St. Louis.
Koons Furnace Company, Danville, Ill.
Leeson Co., T. F., Detroit.

Lennox Furnace Co., Marshalltown, Ia.
McLouth Air Conditioning Corp., Lansing, Mich.

Majestic Co., Huntington, Ind.
Marion Furnace Co., Detroit.

Lennox Furnace Co., Marshalltown, Ia. McLouth Air Conditioning Corp., Lansing, Mich.
Majestic Co., Huntington, Ind.
May-Fiebeger Co., Newark, O.
May-Fiebeger Co., Newark, O.
May-fiebeger Co., Newark, O.
May-fiebeger Co., Peoria, Ill.
Michigan Tank & Furnace Corp., Detroit, Mich. Moncrief Furnace & Mfg. Co., Inc., Dallas, Texas. Morrison Steel Products, Iñc., Buffalo, N. Y.
Mueller Furnace Co., L. J., Milwaukee, Wis. National Manufacturing & Eng. Co., Detroit, Mich. Nelson Corp., Herman, Moline, Ill.
New Mission Hfg. & Vent. Co., San Francisco, Cal.
Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Northern Furnace & Supply Co., Billings, Mont. Ohio Foundry & Mfg. Co., Steubenville, O.
Olsen Mfg. Co., C. A., Elyria, O.
Pacific Gas Heating Co., San Francisco.
Pacific Gas Radiator Co., Huntington Park, Cal. Palmer's Manufacturing Corp., Phoenix, Ariz.
Patten Co., J. V., Sycamore, Ill.
Payne Furnace & Supply Co., Beverly Hills, Cal. Pennsylvania Furnace & Iron Co., Warren, Pa. Perfection Stove Co., Cleveland, O.
Pernot & Rioh, Inc., Los Angeles, Cal.
Premier Furnace Company, Dowagiac, Mich.
Reif-Rexoil, Inc., Buffalo, N. Y.
Reznor Mfg. Co., Mercer, Pa.
Robinson Furnace Company, Dowagiac, Mich.
Royal Air Conditioning Equipment, Alhambra, Cal. Rudy Furnace Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, O.
Ryniker Sheet Metal Works, Inc., Billings, Mont. Schill Mfg. Co., Crestline, O.
Scott-Newcomb, Inc., St. Louis, Mo.
Season-Aire Corporation of America, Detroit.
St. Louis Furnace Manufacturing Co., St. Louis, Mo. Stephens Mfg. Co., Tulsa, Okla.
Twentieth Century Heating & Ventilating Co., Akron, O. United States Radiator Corp., Detroit, Mich.
Utility Fan Corporation, Los Angeles.
Vacuum Gas Appliance Div., Union Fork & Hoe Co., Rome, N.

## FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON

(Complete matched, oil-burning furnace, fan, filter and humidifier unit)

Adelta Manufacturing Co., Philadelphia, Pa.

American Foundry & Furnace Co., Bloomington, Ill.

American Radiator & Standard Sanitary Corp., New York City and Pittsburgh.

Arcweld Manufacturing Co., Inc., Seattle, Wash.

Auto-Heat Corporation, New York City.

Chandler Co., Cedar Rapids, Ia.

Excelsior Steel Furnace Co., Chicago.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis. Gilt Edge Furnace & Mfg. Co., Milwaukee.

Hess-Snyder Co., Massillon, Ohio.

Home Furnace Co., Holland, Mich.

International Heater Co., Utica, N. Y.

Keith Furnace Co., Des Moines, Ia.

Keith Furnace Co., Des Moines, Ia. Kelsey Heating Co., Inc., Syracuse, N. Y. MaGirl Foundry and Furnace Works, P. H., Bloomington, T11

Montag Stove & Furnace Works, Portland, Ore.

Montag Stove & Furnace Works, Portland, Ore.

Mount Vernon Furnace & Mfg. Co., Mount Vernon, Ill.

Mueller Furnace Co., L. J., Milwaukee.
Olsen Mfg. Co., C. A., Elyria, O.
Portland Stove Foundry Co., Portland, Me.

Premier Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio.

St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Sandberg Sheet Metal Works, Portland, Ore.
Sloux City Foundry & Boller Co., Sloux City, Ia.
Standard Furnace & Supply Co., Omaha, Nebr.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill.

#### FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL

(Complete matched, oil-burning furnace, fan, filter and humidifier unit)

(Complete matched, oil-burning furnace, fan, filter and humidifier unit)

Adelta Manufacturing Co., Philadelphia.
Acme Oil Burner Company, Inc., Cedar Rapids, Ia. AlreOzone Corporation, Chicago.

Airtemp Division Chrysler Corp., Dayton, Ohio. American Air Conditioning Corp., Sebastopol, Cal.

American Foundry & Furnace Co., Bloomington, Ill. American Furnace & Foundry Co., Milan, Mich.

American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

American Stove Co., Lorain, O.
American Welding & Engineering Corp., Milwaukee.
Andrews Heating Company, Minneapolls.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, Ohio.
Atlas Heating & Ventilating Co., Ltd., San Francisco.
Auburn Burner Co., Auburn, Ind.
Auto-Heat Corporation, New York City.
Automatic Burner Corporation, Chicago.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Bard Mfg. Co., Bryan, Ohio.

Beck Engineering Combustion Kompany, St. Louis.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Bovee Furnace Works, Waterloo, Ia.
Bryant Corp., C. L., Cleveland.

Calesco Corporation, Lynn, Mass.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
Cary Manufacturing Co., Waupaca, Wis.
Century Engineering Corporation, Cedar Rapids, Iowa.

Chandler Co., Cedar Rapids, Ia.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.

Conco Corporation, Mendota, Ill.
Corozone Air Conditioning Corp., The, Cleveland.

Conco Corporation, Mendota, Ill.
Corozone Air Conditioning Corp., The, Cleveland.

Conco Corporation, Mendota, Ill.
Corozone Air Conditioning Corporation, Lansing, Mich.

Des Moines Stove Repair Co., Des Moines, Iowa.

Dowagiac Steel Furnace Company, Dowagiac, Mich.

Duo-Therm Division, Motor Wheel Corporation, Lansing, Mich.

Easternoll, Inc., Portland, Me.
Electrol Incorporated. Clifton. N. J.

Des Moines Stove Repair Co., Des Moines, Iowa.
Dowagiac Steel Furnace Company, Dowagiac, Mich.
Duo-Therm Division, Motor Wheel Corporation, Lansing,
Mich.
Easternoil, Inc., Portland, Me.
Electrol Incorporated, Clifton, N. J.
Essick Manufacturing Co., Los Angeles.
Evanol Heater Div., Evans Products Co., Detroit.
Evans Corp., George, Moline, Ill.
Excelsior Steel Furnace Co., Chicago.
Farquhar Furnace Co., Wilmington, O.
Fitzgibbons Boiler Co., Inc., New York City.
Fluid Heat Div., Anchor Post Fence Co., Baltimore.
Forest City Foundries Co., Cleveland.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gasoroil Mfg. Corp., Genoa City, Wis.
Gehrl Co., Tacoma, Wash.
General Electric Co., Bloomfield, N. J.
Gilbert & Barker Mfg. Co., Milwaukee.
Gillen Company, J. L., Dowagiac, Mich.
Gill Edge Furnace & Mfg. Co., Milwaukee.
Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
Green Colonial Furnace Co., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfield, Mass.
Heatlox Furnaces, Inc., Tacoma, Wash.
Heil Co., Milwaukee.
Henry Furnace & Fdy. Co., Cleveland.
Hess-Snyder Co., Massillon, Ohio.
Hess Warming & Ventilating Co., Chicago.
Hipoint Corp., Bellefontaine, O.
Hofman Specialty Co., Inc., Stamford, Conn.
Homer Furnace & Foundry Corp., Coldwater, Mich.
Hotentot Cor, Inc., Omaha, Nebr.
Huwer Heating Corp., Detroit.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
International Heater Company, Utica, N. Y.
Interstate Metal Products Co., Inc., Chicago.
Iron Fireman Manufacturing Co., Cleveland.
Joliet Heating Corp., Detroit.
Johnson Co., S. T., Oakland, Cal., and Philadelphia.
Kaustine Co., Inc., Perry, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Corp., Deldwille, Ill.
Lee Furnace Co., Oak Maine, Ind.
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., Chicago.
Knowles Air Conditioning, Minneapolis.
Koons Furnace Company, Huntington, Ind.
Marican Furnace Co., Newark, Ohio.
Index to Advertisers, page 304

May Oil Burner Corp., Baltimore, Md. Mayflower Air-Conditioners, Inc., St. Paul.
 Meyer Furnace Co., Peoria, Ill.

Meyer Furnace Co., Peoria, Ill.
Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
Morrison Steel Products, Inc., Buffalo, N. Y.
Mueller Furnace Co., L. J., Milwaukee.
National Iron Works, San Diego, Cal.
National Manufacturing & Eng. Co., Detroit.
Nelson Company, Detroit.
Nelson Corp., Herman, Moline, Ill.
Norse, Heating & Conditioning, Div. Borg. Works.

 Norge Heating & Conditioning Div., B Detroit.
 Northwest Stove Works, Portland, Ore. Heating & Conditioning Div., Borg-Warner Corp.,

Northwest Stove Works, Portland, Ore.

Nu-Way Corp., Rock Island, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Pacific Gas Heating Co., San Francisco.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Patten Co., J. V., Sycamore, Ill.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Perfection Stove Co., Cleveland.
Petroleum Heat & Power Co., Stamford, Conn.
Progressive Company, Chicago.
Quaker Mfg. Co., Chicago.

Quincy Stove Manufacturing Co., Quincy, Ill.
Ray Oll Burner Co., San Francisco.

Quincy Stove Manufacturing Co., Quincy, Ill.
Ray Oil Burner Co., San Francisco.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rosebraugh Co., W. W., Salem, Ore.
Round Oak Co., Dowagiac, Mich.
R-S Products Corp., Philadelphia.
Rudy Furnace Co., Dowagiac, Mich.
Rybolt Heater Company, Ashland, Ohio.
St. Louis Furnace Manufacturing Co., St. Louis, Mo. Sandberg Sheet Metal Works, Portland, Ore.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis.
Silent Sioux Oil Burner Corp., Orange City, Ia.
Skinner Htg. & Vent. Co., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
Standard Furnace & Supply Co., Omaha, Nebr.
Sundstrand Engineering Company, Rockford, Ill.
Surc Comfort Furnace Co., Berwyn, Ill.
Syncro-Flame Burner Corp., Willimantic, Conn.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.
United States Radiator Corp., Detroit.
Viking Mfg. Corp., Detroit.

Detroit.
United States Radiator Corp., Detroit.
Viking Mfg. Corp., Detroit.
Waterman-Waterbury Co., Minneapolis.
Wayne Oil Burner Corporation, Fort Wayne, Ind.
Western Blower Company, Seattle, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill.
Wheeling Furnace Corporation, Wheeling, W. Va.

Williamson Heater Co., Cincinnati.
Wood Industries, Inc., Gar, Detroit.
York Ice Machinery Corp., York, Pa.
York Oil Burner Company, Inc., York, Pa.

## FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON

(Complete matched, stoker-furnace, fan, filter, and humidifier unit)

Adelta Manufacturing Co., Philadelphia.

• American Foundry & Furnace Co., Bloomington, Ill.

American Furnace & Foundry Co., Milan, Mich.

American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Anchor Stove & Range Co., New Albany, Ind.

Auburn Burner Company, Auburn, Ind.

Bovee Furnace Works, Waterloo, Ia.

Chandler Co., Cedar Rapids, Iowa.

Cleveland Steel Products Corp., Toridheet Div., Cleveland.

Excelsior Steel Furnace Co., Chicago.

Forest City Foundries Co., Cleveland.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.

Gilt Edge Furnace & Mfg. Co., Milwaukee.

Hess-Snyder Co., Massillon, O.

Homer Furnace & Fdry. Corp., Coldwater, Mich.

International Heater Co., Utica, N. Y.

\*Hother Furnace & Fury. Color, Colorader, Men.

Keith Furnace Co., Des Moines, Ia.

MaGirl Foundry and Furnace Works, P. H., Bloomington, Ill.

McLouth Air Conditioning Corp., Lansing, Mich.

McLouth Air Conditioning Corp., Lansing, Mich.

•Majestic Co., Huntington, Ind.

•May-Flebeger Co., Newark, Ohio.

Montag Stove & Furnace Works, Portland, Ore.

•Mount Vernon Furnace & Mfg. Co., Mount Vernon, Ill.

•Mueller Furnace Co., L. J., Milwaukee.

Olsen Mfg. Co., C. A., Elyria, O.

Sioux City Foundry & Boiler Co., Sioux City, Ia.

•St. Louis Furnace Manufacturing Co., St. Louis, Mo.

•Williamson Heater Co., Cincinnati.

Williamson Heater Co., Cincinnati.
Wise Furnace Co., Akron, O.
York Ice Machinery Corporation, York, Pa.

## FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL

(Complete matched, stoker-furnace, fan, filter, and humidifier unit)

American Furnace Co., St. Louis.

American Furnace & Foundry Co., Milan, Mich.

•American Radiator and Standard Sanitary Corp., New York

American Furnace & Foundry Co., Milan, Mich.

American Rudiator and Standard Sanitary Corp., New York

City and Pittsburgh.

American Welding & Engineering Corp., Milwaukee.

Andrews Heating Co., Minneapolls.

Arcweld Manufacturing Co., Inc., Seattle, Wash.

Armstrong Furnace Co., Columbus, Ohio.

Auburn Burner Co., Auburn, Ind.

Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.

Bard Mfg. Co., Bryan, Ohio.

Beck Engineering Combustion Kompany, St. Louis.

Bovee Furnace Works, Waterloo, Ia.

Campbell Heating Co., Des Moines, Ia.

Campbell Heating Co., Des Moines, Ia.

Cleveland Steel Products Corp., Toridheet Div., Cleveland.

Conco Corporation, Mendota, Ill.

Des Moines Stove Repair Co., Des Moines, Iowa.

Dowagiac Steel Furnace Company, Dowagiac, Mich.

Excelsior Steel Furnace Co., Chicago.

Farquhar Furnace Company, Wilmington, Ohio.

Fitzgibbons Boiler Co., Inc., New York City.

Forest City Foundries Co., Cleveland.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.

Gilt Edge Furnace & Mfg. Co., Milwaukee.

Hall-Neal Furnace S., Inc., Tacoma, Wash.

Henry Furnace & Fdy. Co., Cleveland.

Heatlox Furnaces, Inc., Tacoma, Wash.

Henry Furnace & Fdy. Co., Cleveland.

Hess Warming & Ventilating Co., Chicago.

Ingersoll Steel & Disc. Div., Borg-Warner Corp., Chicago.

Iron Fireman Manufacturing Co., Cleveland.

Joliet Heating Corp., Joliet, Ill.

Keith Furnace Co., Danville, Ill.

Keith Furnace Co., South Bend, Ind.

Lennox Furnace Co., Marshalltown, Iowa.

McLouth Air Conditioning Corp., Lansing, Mich.

McPherson Furnace & Supply Co., Portland, Ore.

Majestic Company, Huntington, Ind.

May-Flebeger Co., Newark, Ohio.

Mayflower Air-Conditioners, Inc., St. Paul.

Meyer Furnace Co., Perois, Ill.

Michigan Tank & Furnace Corp., Detroit.

Montag Stove & Furnace Works, Portland, Ore.

National Manufacturing & Engineering Co., Detroit.

Nelson Company, Detroit.

Olsen Mfr. Co., C., A., Elyria, O.

Parker Heating & Manufacturing Co., St. Petersburg, Fla.

Nelson Company, Detroit.

Nelson Company, Detroit.

Olsen Mfg. Co., C. A., Elyria, O.

Parker Heating & Manufacturing Co., St. Petersburg, Fla.

Pocahontas Fuel Company, Incorporated, Stoker Div.,

Cleveland.

Cleveland.

Premier Furnace Co., Dowagiac, Mich.
Robinson Furnace Co., Chicago, Ill.
Rosebraugh Co., W. W., Salem, Ore.

Round Oak Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio.
Sandberg Sheet Metal Works, Portland, Ore.

St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Skinner Hig. & Vent. Co., Heater Div. of St. Louis Blow
Pipe & Heater Co., Inc., St. Louis.
Standard Stoker Corporation, New Albany, Ind.
Stok-A-Fire Co., Inc., University City, Mo.
Sure Comfort Furnace Co., Berwyn, Ill.

Waterman-Waterbury Co., Minneapolis.
Western Furnaces, Inc., Tacoma, Wash,
Westinghouse Electric & Mig. Co., East Springfield, Mass.

Williamson Heater Co., Cincinnati, O.

Wise Furnace Co., Akron, O.

City and Pittsburgh.

## FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, COAL, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

American Furnace Co., St. Louis, Mo. Joliet Heating Corporation, Joliet, Ill. Lee Furnace Co., South Bend, Ind.

#### FURNACES, WARM AIR, AIR CONDITIONING. UTILITY ROOM, GAS, CAST IRON

(Complete matched furnace with burner, fan, filter, humidifier)

Airtemp Div., Chrysler Corporation, Dayton, Ohio.
American Foundry and Furnace Company, Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Radiator and Standard Sanitary Corp., New York

Advertisement in this issue. See Index to Advertisers, page 304

941

Bastian-Morley Co., Inc., LaPorte, Ind.
Bryant Heater Co., Cleveland.
Forest City Foundries Co., Cleveland.
General Electric Co., Air Conditioning & Commercial Refrigeration Dept., Bloomfield, N. J.

Surface Combustion Corporation, Toledo.
Vacuum Gas Appliance Div., Union Fork & Hoe Co., Rome, N. Y.
Vork Lee Machinery Corporation, York, Pa.

York Ice Machinery Corporation, York, Pa.

## FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, GAS, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

(Complete matched furnace with burner, fan, filter, humidifier)

• Airtemp Div., Chrysler Corporation, Dayton, Ohio. Aladdin Heating Corp., Oakland, Cal. Allied Heating & Air Conditioning Co., Lawndale, Cal. American Furnace Co., St. Louis.

• American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Carrier Corporation, Syracuse, N. Y.

• Conco Corporation, Mendota, Ill.

Dalzen Manufacturing Co., Detroit.

Electrogas Furnace Co., San Francisco.

Fraser and Johnston Co., San Francisco.

General Gas Light Co., Kalamazoo, Mich.

Gilbraltar Engineering Co., Los Angeles.

Green Colonial Furnace Co., Des Moines, Ia.

• Hall-Neal Furnace Co., Indianapolis, Ind.

Heating Equipment Co., San Francisco.

Huwer Heating Corp., Detroit.

Ideal Furnace Co., Detroit.

Kent Co., Inc., J. King, St. Louis.

Leeson Co., T. F., Detroit.

• Lochinvar Products, Div. Michigan Tank and Furnace Corp., Dearborn, Mich.

• Majestic Co., Huntington, Ind.

Marion Furnace Co., Detroit.

• Mayflower Air Conditioners, Inc., St. Paul, Minn.

National Manufacturing & Eng. Co., Detroit.

• Pacific Gas Radiator Company, Huntington Park, Cal.

Palmer's Manufacturing Corp., Phoenix, Ariz.

• Patten Co., J. V., Sycamore, Ill.

• Payne Furnace & Supply Co., Beverly Hills, Cal.

Phoenix Furnace & Iron Co., Warren, Pa.

Perfection Stove Co., Cleveland.

Reznor Manufacturing Co., Merced, Pa.

Royal Air Conditioning Equip. Co., Alhambra, Cal.

Rudy Furnace Co., Dowagiac, Mich.

• St. Louis Furnace Manufacturing Co., St. Louis.

Season-Aire Corporation of America, Detroit.

• Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Wood Industries, Inc., Gar, Detroit.

#### FURNACES, WARM AIR, AIR CONDITIONING, UTILITY ROOM, OIL, STEEL

(Complete matched furnace with burner, fan, filter, humidifier)

Airtemp Div., Chrysler Corporation, Dayton, Ohio. American Furnace Co., St. Louis.

American Stove Company, Lorain Div., Lorain, Ohio.

Auburn Burner Company, Auburn, Ind.

Bard Manufacturing Co., Bryan, Ohio.

Carrier Corporation, Syracuse, N. Y.

Cleveland Steel Products Corporation, Torridheet Div., Cleveland.

Cleveland.

Dalzen Manufacturing Co., Detroit, Mich.

Dowagiac Steel Furnace Company, Dowagiac, Mich. Duo-Therm Division, Motor Wheel Corporation, Lansing,

•Fluid Heat Division, Anchor Post Fence Company, Balti-

Fluid Heat Division, Anchor Post Fence Company, Baltimore.
Gasoroll Mfg. Corp., Genoa City, Wis.
Hall-Neal Furnace Co., Indianapolis, Ind.
Huwer Heating Corp., Detroit.
Ideal Furnace Co., Detroit.
Interstate Metal Products Company, Inc., Chicago.
Joliet Heating Corporation, Joliet, Ill.
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., H. C., San Rafael, Cal.
Lochinvar Products Div., Michigan Tank & Furnace Corp., Dearborn, Mich.

Lochinvar Products Div., Michigan Tank & Furnace Corp., Dearborn, Mich.
McPherson Furnace & Supply Co., Portland, Ore.
Majestic Company, Huntington, Ind.
Marion Furnace Co., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
National Manufacturing & Eng. Co., Detroit.
Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Northwest Stove Works, Portland, Ore.
Patten Co., J. V., Sycamore, Ill.
Perfection Stove Co., Cleveland.
Premier Furnace Company, Dowagiac, Mich.
Progressive Company, Chicago.

Progressive Company, Chicago.

Quaker Mfg. Co., Chicago.

Sandberg Sheet Metal Works, Portland, Ore.

Season-Aire Corporation of America, Detroit.
Silent Sioux Oil Burner Corp., Orange City, Iowa.
Viking Manufacturing Corp., Detroit.
Wayne Oil Burner Corp., Fort Wayne, Ind.
Wood Industries, Inc., Gar, Detroit.
York Oil Burner Company, Inc., York, Pa.

## FURNACES, WARM AIR, GRAVITY, COAL, CAST IRON

FURNACES, WARM AIR, GRAVITY, COAL, CAST IRON

Adelta Manufacturing Co., Philadelphia. Agricola Furnace Co., Inc., Gadaden, Ala.

Adricola Furnace Co., Inc., Gadaden, Ala.

Adricola Furnace Co., St. Louis, Mian, Mich.

American Furnace & Foundry Co., Milan, Mich.

American Furnace Corp., Standard Corp., New York

Andes Range & Furnace Corp., Geneva, N. Y.

Barry Furnace Co., Brillion, Wis.

Chandler Co., Cedar Rapids, Ia.

Cleveland Steel Froducts Corp., Toridheet Div., Cleveland.

Columbus Heating & Ventilating Co., Columbus, O.

Des Moines Stove Regal Co., Des Moines, Ia.

Detroit Michigan Stove Co., Detroit, Mich.

Dewaglac Steel Furnace Company, Dowaglac, Mich.

Edwards Furnace Co., Wellsboro, Pa.

Emrich Co., Inc., Columbus, O.

Emrich Co., Inc., Columbus, O.

Enterprise Foundry Co., Belleville, Ill.

Excelsior Steel Furnace Co., Chicago, Ill.

Excelsior Stove & Mrg. Co., Quincy, Ill.

Farris Furnace Co., Sprinkried, Ill.

Hall-Neal Furnace Co., Indianapolis, Ind.

Hallstead Iron Foundry, Hallstead, Pa.

Hart & Crouse Corporation, Utlea, N. Y.

Hart Mrg. Co., Louisville, Ky.

Heckler Bross, Pittaburgh, Pa.

Henry Furnace & Foundry Co., Cleveland, O.

Home Stove Co., Hidanapolis, Ind.

Coldware Furnace Co., Mornouth, Ill.

Union Manufacturing Co., Inc., Boyertown, Pa.
United States Radiator Corp., Detroit, Mich.
Washington Stove Works, Everett, Wash.
Western Furnaces, Inc., Tacoma, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill.

Williamson Heater Co., Cincinnati, O.

Wise Furnace Co., Akron, O.

XXth Century Heating & Ventilating Co., Akron, O.

Thatcher Furnace Company, Newark, N. J.

Twentieth Century Heating & Ventilating Co., Akron, O. United States Radiator Corp., Detroit.

Waterman-Waterbury Co., Minneapolis, Minn. Westinghouse Electric & Mfg. Co., East Springfield, Mass. Wheeling Furnace Corporation, Wheeling, W Va.

Williamson Heater Co., Cincinnati, O.

Wise Furnace Co., Akron, O.

XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, COAL, STEEL

Airtemp Div., Chrysler Corp., Dayton, Ohio.
 American Foundry & Furnace Co., Bloomington, Ill.
 American Furnace Co., St. Louis, Mo.
 American Furnace & Foundry Co., Milan, Mich.
 American Radiator and Standard Sanitary Corp., New York

Airtemp Div., Chrysler Corp., Dayton, Ohio.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Enzineering Corp., Milwaukee, Wis. Andrews Heating Co., Minneapolis.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Bovee Furnace Works, Waterloo, Ia.
Campbell Heating Co., Des Moines, Ia.
Chundler Co., Cedar Rapids, Ia.
Cleveland Sife. Co., Inc., San, Hardwick, Vt.
Deah Miss. Co., Inc., San, Hardwick, Vt.
Deak Miss. Co., Milmington, O.
Excelsior Steel Furnace Co., Dowagiac, Mich.
Emrich Co., Inc., Columbus, O.
Excelsior Steel Furnace Co., Cleveland, O.
Front Rank Furnace Co., Wilmington, O.
Front Rank Furnace Co., Wilmington, O.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis, Gascol Furnace Co., Pittsburgh (Combination Coal and Gas) Gehri Co., Tacoma, Wash.
Gilt Edge Furnace & Mfg. Co., Milwaukee, Green Colonial Furnace Co., Indianapolis, Ind.
Hart Mfg. Co., Louisville, Ky.
Heinry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Hess Warning & Ventilating Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Hess Warning & Ventilating Co., Chicago, Ill.
Home Blove Co., Indianapolis, Ind.
Lee Furnace Co., Dea Mill

#### FURNACES, WARM AIR, GRAVITY, FLOOR

(For suspension beneath floor)

AireOzone Corporation, Chicago. (Oil).
Aladdin Heating Corp., Oakland, Cal.
Allied Heating & Air Conditioning Co., Lawndale, Cal.
Andes Range & Furnace Corp., Geneva, N. Y.
Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Beck Engineering Combustion Kompany, St. Louis.
Capps, Joseph, Inc., South Gate, Cal.
Cole Hot Blast Manufacturing Co., Chicago. (Gas)
Coleman Lamp & Stove Co., Wichita, Kan.
Dallman Supply Co., Sacramento, Cal.
Day & Night Manufacturing Co., Monrovia, Cal. (Gas).
Dowagiac Steel Furnace Company, Dowagiac, Mich.
East Anaheim Sheet Metal Works, Long Beach, Cal.
Electrogas Furnace Co., San Francisco, Cal. (Gas)
Essick Manufacturing Co., Los Angeles, Cal.
Framilian Pipe & Supply Co., Los Angeles, Cal.
Fraser and Johnston Co., San Francisco.
Gillen Company, J. L., Dowagiac, Mich.
Heating Equipment Co., San Francisco. (Gas)
Heckler Bros., Pittsburgh, Pa. (Gas)
Holley Heating & Mfg. Co., Pasadena, Cal.
Ideal Heating Corp., Los Angeles. (Gas)
Kelly Mfg. Co., Houston, Tex.
King Metal Co., Oklahoma City, Okla.
Koons Furnace Co., Marshalltown, Ia. (Gas)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Mayfair Furnace Co., Hollywood, Cal.

Koons Furnace Co., Danville, Ill.

Lennox Furnace Co., Marshalltown, Ia. (Gas)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Mayfair Furnace Co., Hollywood, Cal.
Miller Floor Furnace Co., Oakland, Cal.
Mission Water Heater Co., Los Angeles, Cal.
Monarch Heating Co., Los Angeles,
Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Gas)
Mueller Furnace Co., L. J., Milwaukee, Wis. (Gas)
Ohio Foundry & Mfg. Co., Steubenville, O.
O'Keefe & Merritt Co., Los Angeles.
Pacific Gas Heating Co., San Francisco (Gas)
Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Pennsylvania Furnace & Iron Co., Warren, Pa. (Gas)
Ploneer Water Heater Co., Los Angeles.
Rock Island Stove Co., Rock Island, Ill. (Coal)
Royal Air Conditioning Equipment, Compton, Cal. (Gas)
Rudy Furnace Co., Dowagiac, Mich.
Stephens Mfg. Co., Tulsa, Okla.
Sutphen & Co., J. W., Los Angeles.
Surface Combustion Corp., Toledo, O. (Gas)
Tennessee Enamel Mfg. Co., Nashville, Tenn.
U-Ni-Matic Heating Systems, Inc., Los Angeles, Cal. (Gas)
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Woods-Evertz Stove Co., Springfield, Mo.

Zink Co., John, Tulsa, Okla. (Gas)

#### FURNACES, WARM AIR, GRAVITY, GAS, CAST IRON

American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
Chandler Co., Cedar Rapids, Ia.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Favorite Stove Co., Piqua, O.
Forest City Foundries Co., Cleveland, O.
Hart Mfg. Co., Louisville, Ky.
Henry Furnace & Foundry Co., Cleveland.
Hess-Snyder Co., Massillon, O.
Ideal Furnace Co., Detroit.
Jackson Sheet Metal Works, Ogden, Utah. (Combination Iron and Steel)
Johnson Gas Furnace Corp., North Hollywood, Cal.
Kelsey Heating Co., Syracuse, N. Y.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
Pacific Gas Radiator Co., Huntington Park, Cal.
Reznor Mfg. Co., Mercer, Pa.
Rudy Furnace Co., Dowaglac, Mich.
Rybolt Heater Company, Ashland, O.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
Surface Combustion Corp., Toledo, O.
Index to Advertisers, page 304

Advertisement in this issue. See Index to Advertisers, page 304

1941

Twentieth Century Heating & Ventilating Co., Akron, O.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, GAS, STEEL

Airtemp Div., Chrysler Corp., Dayton, Ohio.
 Aladdin Heating Corp., Oakland, Cal.
 Allied Heating & Air Conditioning Co., Lawndaie, Cal.
 American Furnace Co., St. Louis, Mo.
 American Radiator and Standard Sanitary Corp., New York
 City and Pittsburgh.
 American Standard Cos Products Co. Detroit

Allddin Heating Corp., Osaram, Co., Lawndale, Cal. American Furnace Co., St. Louis, Mo.

American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

American Standard Gas Products Co., Detroit.

Andrews Heating Co., Minneapolis.

Armstrong Furnace Co., Columbus, O.

Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.

Beck Engineering Combustion Kompany, St. Louis.

Bryant Corp., C. L., Cleveland O.

Burmester Gas Furnace Mfg. Co., Omaha, Nebr. (Sheet Iron)

Calkins & Pearce, Columbus, O.

Century Engineering Corp., Cedar Rapids, Ia.

Cocking, Geo. J., Santa Ana, Cal.

Coleman Lamp & Stove Company, Wichita, Kansas.

Dallman Supply Co., Sacramento, Cal.

Detroit Michigan Stove Co., Detroit, Mich.

Dornbach Furnace & Foundry Co., Cleveland.

Electrogas Furnace Co., San Francisco, Cal.

Essick Manufacturing Co., Los Angeles.

Forest City Foundries Co., The, Cleveland.

Fraser and Johnston Co., San Francisco.

Gascol Furnace Co., Pittsburgh (Comb. Coal and Gas)

Green Colonial Furnace Co., Des Molnes, Ia.

Hall-Neal Furnace Co., Indianapolis, Ind.

Heating Equipment Co., San Francisco.

Heckler Bros., Pittsburgh, Pa.

Henry Furnace & Foundry Co., Cleveland.

Hess-Snyder Co., Massillon, O.

Helley Heating & Mfg. Co., Pasadena, Cal.

Hotentot Company, Inc., Omaha, Nebr.

Ideal Furnace Co., Detroit.

Independence Stove & Furnace Corp., North Hollywood, Cal.

Lennox Furnace Co., Detroit.

May-Flebeger Co., Newark, O.

Mayflower Air-Conditioners, Inc., St. Paul.

Meyer Furnace Co., L. J., Milwaukee, Wis.

National Iron Works, San Diego, Cal.

Marion Furnace Co., L. J., Milwaukee, Wis.

National Iron Works, San Diego, Cal.

National Mfg. & Engineering Co., Detroit.

New Mission Heating & Mentilating Co., St. Petersburg, Fla.

Payne Furnace & Supply Co., Blilings, Mont.

Olsen Mfg. Co., C. A., Elyria, O.

Payne Furnace Co., Levendand, Resnor Manufacturing Corp., Phoenix, Ariz.

Parker Heating & Manufacturing Corp., Phoenix, Ariz.

Parker Heating & Manufacturing Corp., Phoenix, Cal.

Payne Furnace

#### FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON

Adelta Manufacturing Co., Philadelphia.
Airtherm Mfg. Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.

American Radiator & Standard Sanitary Corp., New York
City and Pittsburgh.
Arcweld Mfg. Co., Seattle, Wash.

Chandler Co., Cedar Rapids, Iowa.
Detroit Michigan Stove Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.

Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Green Colonial Furnace Co., Des Moines, Ia.
Hart & Crouse Corporation, Utica, N. Y.
Harvey-Whipple, Inc., Springfield, Mass.

Henry Furnace & Foundry Co., Cleveland, O. Hess.-Snyder Co., Massillon, Ohio. Ideal Furnace Co., Detroit.
International Heater Co., Utica, N. Y. Keith Furnace Co., Des Moines, Ia. Kelsey Heating Co., Syracuse, N. Y.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. Montag Stove & Furnace Works, Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee. Olsen Mfg. Co., C. A., Elyria, O. Sloux City Foundry & Boiler Co., Sioux City, Ia.
St. Louis Furnace Mfg. Co., St. Louis. Thatcher Furnace Company, Newark, N. J. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

#### FURNACES, WARM AIR, GRAVITY, OIL, STEEL

American Air Conditioning Corp., Sebastopol, Cal.
American Furnace & Foundry Co., Milan, Mich.
American Furnace Co., St. Louis, Mo.

American Radiator and Standard Sanitary Corp., New
York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee.
Andrews Heating Co., Minneapolis.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Bard Manufacturing Co., Bryan, O.

Beck Engineering Combustion Kompany, St. Louis.

Calesco Corporation, Lynn, Mass.

Galesco Corporation, Lynn, Mass.
 Calesco Corporation, Lynn, Mass.
 Campbell Heating Co., Des Moines, Ia.
 Cary Mfg. Co., Waupaca, Wis.
 Century Engineering Corp., Cedar Rapids, Iowa.
 Chandler Company, Cedar Rapids, Ia.
 Dowagiac Steel Furnace Co., Dowagiac, Mich.
 Duo-Therm Division, Motor Wheel Corporation, Lansing, Mich.
 Carry Poles Co., Ann. Apper Mich.

Duo-Therm Division, Motor Wheel Corporation, Lansing, Mich.

Economy Baler Co., Ann Arbor, Mich.
Essick Manufacturing Co., Los Angeles.
Evanoil Heater Div., Evans Products Co., Detroit.

Excelsior Steel Furnace Co., Chicago, Ill.
Farquhar Furnace Co., Wilmington, O.
Floral City Co., Monroe, Mich.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gasoroil Mfg. Corp., Genoa City, Wis.
Gehri Co., Tacoma, Wash.
Gilbert & Barker Mfg. Co., Springfield, Mass.

Gillen Company, J. L., Dowagiac, Mich.
Green Colonial Furnace Co., Des Moines, Ia.

Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfield, Mass.

Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.

Hess Warming & Ventilating Co., Chicago.
Hotentot Co., Inc., Omaha, Nebr.
Ideal Furnace Co., Detroit.
Johnston Gas Furnace Corp., North Hollywood, Cal.
Joliet Heating Corp., Joliet, Ill.
Keith Furnace Co., Des Moines, Ia.
Knowles Air Conditioning, Minneapolis.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lee Furnace Co., South Bend, Ind.
Leenox Furnace Co., Marshalltown, Ia.
Little Burner Co., Inc., H. C., San Rafael, Cal.

Lochinvar Products Div., Michigan Tank & Furnace Corp.,
Dearborn, Mich.

McLouth Air Conditioning Corp., Lansing, Mich.

Little Burner Co., Inc., H. C., San Rafael, Cal.

Lochinvar Products Div., Michigan Tank & Furnace Corp., Dearborn, Mich.

McLouth Air Conditioning Corp., Lansing, Mich.

May-Flebeger Co., Newark, Ohio.

Mayflower Air-Conditioners, Inc., St. Paul.

Meyer Furnace Co., Peoria, Ill.

Michigan Tank & Furnace Corp., Detroit.

Montag Stove & Furnace Works, Portland, Ore.

Mueller Furnace Co., L. J., Milwaukee, Wis.

National Iron Works, San Diego, Cal.

Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Northwest Stove Works, Portland, Ore.

Olsen Mfg. Co., C. A., Elyria, O.

Pacific Gas Radiator Co., Huntington Park, Cal.

Parker Heating & Manufacturing Co., St. Petersburg, Fla.

Peerless Foundry Co., Indianapolis, Ind.

Perfection Stove Co., Cleveland, O.

Portland Stove Foundry Co., Portland, Me.

Premier Furnace Co., Dowagiac, Mich.

Progressive Co., Chicago.

Quincy Stove Manufacturing Co., Quincy, Ill.

Rock Island Stove Co., Rock Island, Ill.

Rosebraugh Co., W. W., Salem, Ore.

Round Oak Co., Dowagiac, Mich.

Rybolt Heater Company, Ashland, Ohio.

St. Louis Furnace Mfg. Co., St. Louis.

Sandberg Sheet Metal Works, Portland, Ore.

Scott-Newcomb, Inc., St. Louis, Mo.

Sloux City Foundry & Boiler Co., Sloux City, Ia.

Sure Comfort Furnace Co., Berwyn, Ill.

Thatcher Furnace Company, Newark, N. J.

Twentieth Century Heating & Ventilating Co., Akron, O.

United States Radiator Corp., Detroit.
Viking Mfg. Co., Detroit.

•Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Company, Seattle, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
•Williamson Heater Co., Cincinnati, O.
•Wise Furnace Co., Akron, O.
•XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON

Adelta Manufacturing Co., Philadelphia.

American Furnace & Foundry Co., Milan, Mich.

•American Radiator and Standard Sanitary Corp., New York

American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York
City and Pittsburgh.
Anchor Stove & Range Co., New Albany, Ind.

Chandler Co., Cedar Rapids, Ia.

Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gilt Edge Furnace & Mfg. Co., Milwaukee.

Hall-Neal Furnace & Foundry Co., Cleveland, O.
Henry Furnace & Foundry Corp., Coldwater, Mich.
Ideal Furnace & Foundry Corp., Coldwater, Mich.
Ideal Furnace Co., Destroit.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.

Majestic Co., Huntington, Ind.
Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Mueller Furnace Co, L. J., Milwaukee. (Double Radiator)
Olsen Mfg. Co., C. A., Ellyrla, O.

Premier Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Sloux City Fdy. & Boller Co., Sloux City, Ia.
Twentieth Century Heating & Ventilating Co., Akron, Ohio.

Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, Ohio.

#### FURNACES, WARM AIR, GRAVITY, STOKER, STEEL

FURNACES, WARM AIR, GRAVITY, STOKER, STEEL

American Radiator & Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee.
Andrews Heating Company, Minneapolis.
Arcweld Mig. Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mig. Co., Toledo, Ohio.
Beck Engineering Combustion Kompany, St. Louis.
Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Glit Edge Furnace & Mig. Co., Milwaukee.
Grossenbacher Furnace Co., St. Louis.
Glit Edge Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
Hearl-Furnace Co., Detroit.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Keith Furnace Co., Detroit.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Keith Furnace Co., Des Moines, Ia.
Lee Furnace Co., South Bend, Ind.
Lennox Furnace Co., Marshalltown, Ia.
McLouth Air Conditioning Corp., Lansing, Mich.
May-Fiebeger Co., Newark, Ohio.
Mayflower Air-Conditioners, Inc., St. Paul.
Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Northwest Stove Works, Portland, Ore.
Olsen Mig. Co., C. A., Elyria, O.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Premier Furnace Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio.
St. Louis Furnace Mig. Co., St. Louis.
Schwitzer-Cummins Co., Indianapolis, Ind.
Spencer Heater Div., Aviation Mig. Corp., Williamsport, Pa.
Stok-A-Fire Co., Inc., University City, Mo.
Sure Comfort Furnace Co., Berwyn, Ill.
Twentieth Century Heating & Ventilating Co., Akron, O.
Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Heater Co., Cincinnati, O.
Waterman-Waterbury Co., Minneapolis, Minn.

rp.,

1941

#### FURNACES, WARM AIR, HORIZONTAL

Acme Heating & Ventilating Co., Chicago, Iil.

• American Foundry & Furnace Co., Bloomington, Ill.

Andrews Heating Co., Minneapolis.

Arcweld Mfg. Co., Inc., Seattle, Wash.

Bovee Furnace Works, Waterloo, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Floral City Co., Monroe, Mich.
Lee Furnace Co., South Bend, Ind.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Majestic Co., Huntington, Ind.
McPherson Furnace & Supply Co., Portland, Ore.
Moncrief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Works, Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit.
Northwest Stove Works, Portland, Ore.
Parker Heating & Manufacturing Co., St. Petersburg, Fla.
Ramey Mfg. Co., Columbus, O.
Rosebraugh Co., W. W., Salem, Ore.
Sandberg Sheet Metal Works, Portland, Ore.
Thermal Engineering Associates, Chicago.
Twentieth Century Heating & Ventilating Co., Akron, O.
Western Blower Company, Seattle, Wash.
Western Furnaces, Inc., Tacoma, Wash.

•XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, PIPELESS, CAST IRON

Agricola Furnace Co., Inc., Gadsden, Ala.
Airtherm Mfg. Co., St. Louis.

•American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.

•American Radiator and Standard Sanitary Corp., New York

American Furnace & Foundry Co., Milan, Mich.

American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York
City and Pittsburgh.

Andes Range & Furnace Corp., Geneva, N. Y.
Barry Furnace Co., Hamilton, O.
Brillion Furnace Co., Brillion, Wis.

Chandler Co., Cedar Rapids, Ia.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Danville Stove & Mfg. Co., Danville, Pa.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellboro, Pa.
Emrich Co., Inc., Columbus, O.
Enterprise Foundry Co., Belleville, Ill.

Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Steel Furnace Co., Quincy, Ill.
Favorite Stove & Mfg. Co., Quincy, Ill.
Favorite Stove Co., Piqua, O.
Floral City Co., Monroe, Mich.
Floyd-Wells Co., Royersford, Pa.
Forest City Foundries Co., Cleveland, O.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gilt Edge Furnace & Mfg. Co., Milwaukee.
Green Foundry & Furnace Works, Des Moines, Ia.

Hall-Neal Furnace Co., Indianapolis, Ind.
Hart & Crouse Corporation, Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
Heckler Bros., Pittsburgh, Pa.

Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace & Foundry Corp., Coldwater, Mich.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
International Heater Company, Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Magiri Foundry and Furnace Works, P. H., Bloomington,
Ill.
Marshall Furnace Co., Marshall Mich.
Marshall Furnace Co., Marshall Mich.
Mich.
Marshall Furnace Co., Marshall Mich.
Mich.
Marshall Furnace Co., Marshall Mich.

MaGirl Foundry and Furnace Works, P. H., Bloomingto Ill.

Maple City Furnace Co., Monmouth, Ill.

Marshall Furnace Co., Marshall, Mich.

May-Fiebeger Co., Newark, O.

Meyer Furnace Co., Peoria, Ill.

Montag Stove & Furnace Works, Portland, Ore.

Moore Corp., Joliet, Ill.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Mueller Furnace Co., L. J., Milwaukee, Wis.

Olsen Mfg. Co., C. A., Elyria, O.

Orbon Stove Co., Belleville, Ill.

Pittsburgh Furnace Parts Co., Pittsburgh, Pa.

Portland Stove Foundry Co., Portland, Me.

Premier Furnace Co., Dowagiac, Mich.

Ravenna Furnace & Heating Co., Ravenna, O.

Richardson & Boynton Co., New York City.

Robinson Furnace Co., Chicago, Ill.

Rudy Furnace Co., Dowagiac, Mich.

Rybolt Heater Co., Ashland, O.

St. Clair Foundry Corp., Centralia, Ill.

St. Louis Furnace Mfg. Co., St. Louis, Mo.

Schill Mfg. Co., Crestline, O.

Security Stove & Mfg. Co., Kansas City, Mo.

Sloux City Foundry & Boiler Co., Sloux City, Iowa.

Stiglitz Furnace & Foundry Co., Louisville, Ky.

Thatcher Furnace Co., Newark, N. J.

Twentieth Century Heating & Ventilating Co., Akron, O.

United States Radiator Corp., Detroit, Mich.

Washington Stove Works, Everett, Wash.

Westwick & Son, Inc., Tacoma, Wash.

Westwick & Adventions and St.

Western Furnaces, Inc., Tacoma, Wash Westwick & Son, Inc., John, Galena, Ill.

Williamson Heater Co., Cincinnati, O.
Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

#### FURNACES, WARM AIR, PIPELESS, STEEL

FURNACES, WARM AIR, PIPELESS, STEEL

Airtherm Manufacturing Co., St. Louis.
Aladdin Heating Corp., Oakland, Cal.
American Furnace & Foundry Co., Milan, Mich.
Andrews Heating Co., Minneapolis.
Arcweld Manufacturing Co., Inc., Seattle, Wash.
Armstrong Furnace Co., Columbus, O.
Campbell Heating Co., Des Moines, Ia.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Detroit Michigan Stove Co., Detroit, Mich.
Dowaglac Steel Furnace Co., Dowaglac, Mich.
Floral City Co., Monroe, Mich.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gilt Edge Furnace & Mfg. Co., Milwaukee.
Grossenbacher Furnace Co., St. Louis.
Hart Mfg. Co., Louisville, Ky.
Henry Furnace & Foundry Co., Cleveland, O.
Hess Warming & Ventilating Co., Chicago, Ill.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lennox Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lennox Furnace Co., Syracuse, N. Y.
Koons Furnace Co., Seattle, Wash.

May-Flebeger Co., Newark, O.
Meyer Furnace Co., Peoria, Ill.

Michigan Tank & Furnace Works, Portland, Ore.
National Iron Work, San Diego, Cal.
Northwest Stove Works, Portland, Ore.
Nugent Sons, Inc., Thos., New York City.
Olsen Mfg. Co., C. A., Elyria, O.
Orbon Stove Co., Belleville, Ill.
Payne Furnace & Supply Co., Beverly Hills, Cal.
Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Furnace Parts Co., Pittsburgh, Pa.
Ramey Mfg. Co., Columbus, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Rosebraugh Co., W. W., Salem, Ore.
St. Louis Furnace Mfg. Co., St. Louis, Mo.
Stanton Heater Co., Marins Ferry, O.
Stiglitz Furnace & Foundry Co., Louisville, Ky.
Twentleth Century Heating & Ventilating Co., Akron, O.

Waterman-Waterbury Co., Minneapolis, Minn. Airtherm Manufacturing Co., St. Louis.

## FURNACES, WARM AIR, WOOD BURNING, CAST IRON

Floral City Co., Monroe, Mich.
Gilt Edge Furnace & Mfg. Co., Milwaukee.
Hart & Crouse Corporation, Utica, N. Y.

Homer Furnace & Foundry Corp., Coldwater, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
MaGirl Foundry and Furnace Works, P. H., Bloomington,

Majestic Company, Huntington, Ind.
Montag Stove & Furnace Works, Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Oakland Foundry Co., Belleville, Ill.
Portland Stove Foundry Co., Portland, Me.
Western Furnaces, Inc., Tacoma, Wash.

## FURNACES, WARM AIR, WOOD BURNING,

American Welding & Engineering Corp., Milwaukee, Wis. Andrews Heating Co., Minneapolis.

Arcweld Manufacturing Co., Inc., Seattle, Wash. Bovee Furnace Works, Waterloo, Ia.

Campbell Heating Co., E. K., Kansas City, Mo. Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis. Glit Edge Furnace & Mfg. Co., Milwaukee.

Grossenbacher Furnace Co., St. Louis.

Henry Furnace & Foundry Co., Cleveland.

Hess Warming & Ventilating Co., Chicago, Ill.

Lennox Furnace Co., Marshalltown, Ia.

McLouth Air Conditioning Corp., Lansing, Mich.

McPherson Furnace & Supply Co., Portland, Ore. (Also Sawdust)

Sawdust)

Meyer Furnace Co., Peoria, Ill.
 Montag Stove & Furnace Works, Portland, Ore.

Northwest Stove Works, Portland, Ore. Rosebraugh Co., W. W., Salem, Ore. Sandberg Sheet Metal Works, Portland, Ore.

#### GAGES. AIR FILTER

Air Filter Engineering Co., Chicago.

American Air Filter Co., Inc., Louisville, Ky.
Defender Automatic Regulator Co., St. Louis.

Dwyer Mfg. Co., F. W., Chicago.
Ellison Draft Gage Co., Chicago.
Friez & Sons, Julien P., Baltimore.
Hays Corporation, Michigan City, Ind.
Herbusch Corporation, Simplex Control Div., St. Louis.
Hill Co., E. Vernon, Chicago.
Huyette Co., Inc., Paul B., Philadelphia.
Meriam Co., Cleveland.

#### GAGES, INDICATING, DRAFT, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Defender Automatic Regulator Co., St. Louis.
Detroit Air Meter Co., Detroit.
Dwyer Mfg. Co., F. W., Chicago.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
Hays Corp., Michigan City, Ind.
Hill Co., E. Vernon, Chicago, Ill.
Hotstream Heater Co., The. Cleveland. O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corporation, Jas. P., Chicago.
Meriam Co., Cleveland, O.
Moeller Instrument Co., New York City.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp.. New York City.
Scientific Instrument Co., Detroit.
Taylor Instrument Companies, Rochester, N. Y.
Uchling Instrument Co., Paterson, N. J. Uehling Instrument Co., Paterson, N. J.

#### GLASS, WIRE, FOR SKYLIGHTS

Atcheson Glass Co., T. J., Buffalo.
 Mississippi Glass Company, New York City.

#### GRILLES, HEATING AND VENTILATING

GRILLES, HEATING AND VENTILATING

Air Control Products, Inc., Muskegon, Mich.

American Foundry & Furnace Co., Bloomington, Ill.

American Warming & Ventilating Co., Toledo, O.

Auer Register Co., Cleveland, O.

Barber-Colman Company, Rockford, Ill.

Beckley Perforating Co., Garwood, N. J.

Best Register Co., Milwaukee, Wis.

Central Wire & Iron Works, Des Molnes, Ia.

Char-Gale Mfg. Co., Minneapolis.

Chase Brass & Copper Co., Inc., Waterbury, Conn.

Chicago Perforating Co., Chicago, Ill.

Cincinnati Mfg. Co., Cincinnati, O.

Cross Engineering Company, Carbondale, Pa.

Crown Iron Works, Minneapolis.

Decatur Iron & Steel Co., Decatur, Ala.

Diamond Mfg. Co., Wyoming, Pa.

Erdle Perforating Co., Rochester, N. Y.

Falstrom Co., Passaic, N. J.

Gillian Mfg. Co., Detroit.

Globe Machine & Stamping Co., Cleveland, O.

Harrington & King Perforating Co., Chicago, Ill.

Hart & Cooley Mfg. Co., Holland, Mich.

Hendrick Mfg. Co., Carbondale, Pa.

Independent Register Co., Cleveland, O.

Jamieson Mfg. Co., Dallas, Texas.

Knowles Mushroom Ventilator Co., Montclair, N. J.

Lamneck Products, Inc., Middletown, Ohio.

Lockjoint Wood Products Co., Wichita Kan. (Wood)

Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.

Metalace Corp., South Boston, Mass.

Mueller Furnace Co., L. J., Milwaukee, Wis.

Manhattan Perforated Metal Co., Inc., Long 1816
N. Y.
Metalace Corp., South Boston, Mass.

Mueller Furnace Co., L. J., Milwaukee, Wis.
Mundt & Sons, Charles, Jersey City, N. J.
Newman Brothers, Inc., Cincinnati, O.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Roberts-Hamilton Co., Minneapolis, Minn.
Rock Island Register Co., Rock Island, Ill.
Standard Stamping & Perforating Co., Chicago.
Trane Co., La Crosse, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.
U. S. Air Conditioning Corp., Minneapolis.
United States Register Co., Battle Creek, Mich.
Utility Fan Corporation, Los Angeles, Cal.
Waterloo Register Co., Waterloo, Ia.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wickwire Spencer Steel Co., New York City.
Wooster Art Wood, Inc., Wooster, Ohio.

## GRINDERS, BUFFERS, POLISHERS AND SANDERS

See Buffers, Grinders, Polishers and Sanders

#### GUARDS, MACHINERY

Biersach & Niedermeyer Company, Milwaukee.
Chicago Perforating Co., Chicago.
Diamond Manufacturing Co., Chicago.
Edwards Manufacturing Co., Inc., Cincinnati.
Harrington & King Perforating Co., Chicago.
Hendrick Manufacturing Company, Carbondale, Pa.
Industrial Sheet Metal Works, Inc., Detroit.
Morrison Products, Inc., Cleveland.
Riester & Thesmacher Company, Cleveland.
Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow
Pipe & Heater Co., Inc., St. Louis.
Standard Stamping & Perforating Co., Chicago.
Western Wire & Iron Works, Inc., Chicago. Biersach & Niedermeyer Company, Milwaukee.

#### GUARDS, SNOW

Berger Brothers Co., Philadelphia, Pa.
Boyd & Co., Inc., Chas. P., Philadelphia.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
Folsom Snow Guard Co., Boston, Mass.
Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Levow, David, New York City.
Maysteel Products, Inc., Mayville, Wis.
Royal-Apex Mfg. Corp., Brooklyn, N. Y. (Cast Iron)
Wickwire Spencer Steel Co., New York City.

## GUNS, SPRAY, METALS

Metals Coating Co. of America, Philadelphia, Pa. Turner Brass Works, Sycamore, Ill.

## GUNS, SPRAY, PAINT

Binks Mfg. Co., Chicago, Ill.
De Vilbiss Co., Toledo, O.
Eclipse Air Brush Company, Inc., Newark, N. J.
Electric Sprayit Co., Milwaukee, Wis.
Hobart Brothers Company, Troy, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Matthews & Company, J. H., New York City.
Milburn Co., Alexander, Baltimore, Md.
Spray Engineering Co., Somerville, Mass.

## GUTTERS

See Eaves Trough and Gutters

#### HARDWARE, FOR CABINETS AND CASINGS

(Handles, name plates, etc.)

(Handles, name plates, etc.)

American Cabinet Hardware Corp., Rockford, Ill. (Pulls, Knobs, Hinges, Catches, etc.)

American Emblem Co., Utica, N. Y. (name plates)

American Insulator Corp., New Freedom, Pa.

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.

Brasco Manufacturing Co., Harvey, Ill.

Crowe Name Plate & Mfg. Co., Chicago.

Dickey-Grabler Co., Cleveland (name plate)

Etched Products Co., Long Island City, N. Y. (name plates)

General Etching & Mfg. Co., Chicago (name plates)

Grammes, L. F., & Sons, Inc., Allentown, Pa.

Imperial Molded Products Corp., Chicago (Plastic handles, pulls and knobs)

Mason & Sons, F. E., Batavia, N. Y. (name plates)

Metal Marker Co., Cleveland. (name plates)

National Lock Co., Rockford, Ill.

Premier Metal Etching Co., Long Island City (name plates)

Soss Manufacturing Co., Roselle, N. J. (Invisible Hinges)

Stafford Co., N., Brooklyn, N. Y. (name plates)

Stanley Mfg. Co., Dayton, O. (name plates)

#### HEAT TRANSFER SURFACE

See Coils, Cooling, Direct Expansion; Coils, Heating; Coils, Cooling, Water

## HEATERS, CIRCULATING, CABINET TYPE

Acme Tin Plate & Roofing Supply Co., Philadelphia.
American Furnace Co., St. Louis, Mo. (Gas and Oil)
Ames Co., W. R., San Francisco.
Andrews Heating Co., Minneapolis. (Coal and Oil)
Auburn Burner Co., Auburn, Ind. (Oil)

Cole Hot Blast Manufacturing Co., Chicago. (Coal, Oil,
Gas, Wood)
Continents Store Corp. Jacobson. Co. (Gas)

Continental Stove Corp., Ironton, O. (Gas) Corozone Air Conditioning Corp., Cleveland, O. (Gas and Oil)

Day & Night Manufacturing Co., Monrovia, Cal. (Gas)
Duo-Therm Division, Motor Wheel Corporation, Lansing,
Mich. (Oil)
Edwards Manufacturing Co., Inc., Cincinnati (Coal, Coke,

Wood)
Estate Stove Co., Hamilton, O.
Evanoil Heater Div., Evans Products Co., Detroit. (Oil &

Gas)
Florence Stove Co., Garner, Mass. (Oil)
Gilbert & Barker Mfg. Co., Springfield, Mass.
Globe Machine & Stamping Co., Cleveland. (Oil)
Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
Heating Equipment Co., San Francisco. (Gas)
Hudson-Root Company, Brocton, N. Y.
Independence Stove & Furnace Co., Independence, Mo. (Gas

Heating Equipment Co., San Francisco. (Gas)
Hudson-Root Company, Brocton, N. Y.
Independence Stove & Furnace Co., Independence, Mo. (Gas
or Coal)
Kleen-Heet, Inc., Chicago. (Oil)
Laco Oil Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Linergan Manufacturing Co., Albion, Mich.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Coal, Gas,
Oil and Wood)
Ohio Foundry & Mfg. Co., Steubenville, O.
Orbon Stove Co., Belleville, Ill.

Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Mfg. Corp., Phoenix, Ariz. (Gas)
Patten Co., J. V., Sycamore, Ill. (Coal, Oil and Gas).

Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland. (Oil)
Pernot & Rich., Inc., Los Angeles.
Pittston Stove Co., Pittston, Pa. (Coal or Wood)
Quaker Mfg. Co., Chicago, Ill. (Oil)
Reznor Mfg. Co., Chicago, Ill. (Oil)
Reznor Mfg. Co., Chicago, Ill. (Oil)
Reznor Mfg. Co., Mercer, Pa. (Gas)
Rome Grader & Machinery Corp., Rome, N. Y. (Gas)
Royal Air Conditioning Equip. Co., Alhambra, Cal.
Schoedinger, F. O., Columbus, Ohio.
Shreveport Engineering Co., Inc., Shreveport, La.
Silent Glow Oil Burner Corp., Hartford, Conn.
Silent Sioux Oil Burner Corp., Orange City, Ia. (Oil)
Snoair Company, Dallas, Texas.

Surface Combustion Corp., Toledo, O. (Gas)
Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)
Universal Utilities, Crestline, O. (Oil)

Utility Fan Corporation, Los Angeles. (Gas)
Vacuum Gas Appliance Div., Union Fork & Hoe Co., Rome,
N. Y. (Gas)
Victor Oil Burner Mfg. Co., Hartford, Conn.
Viking Mfg. Corp., Detroit.

#### HEATERS, SCHOOL ROOM

HEATERS, SCHOOL ROOM

Agricola Furnace Co., Inc., Gadsden, Ala.

American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.

American Radiator and Standard Sanitary Corp., New York
City and Pittsburgh.
Andrews Heating Co., Minneapolfs.
Barry Furnace Co., Hamilton, O.
Brillion Furnace Co., Brillion, Wis.
Campbell Heating Co., Des Moines, Ia.

Chandler Co., Cedar Rapids, Ia.
Corozone Air Conditioning Corp., Cleveland, O.
Daniels Mfg. Co., Inc., Sam. Hartwick, Vermont. (Wood)
Danville Stove & Mfg. Co., Danville, Pa.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Estate Stove Co., Hamilton, O.

Excelsior Steel Furnace Co., Chicago.
Excelsior Steel Furnace Co., Chicago.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farris Furnace Co., Springfield, Ill.
Floral City Co., Monroe, Mich.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Green Colonial Furnace Co., Des Moines, Ia.
Hart & Crouse Corporation, Utica, N. Y.
Hart Mfg. Co., Louisville, Ky. (Coal and Gas)

Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
Home Stove Co., Indianapolis, Ind.

Homer Furnace & Foundry Corp., Coldwater, Mich.

International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Koons Furnace Co., Danville, Ill.

Lennox Furnace Co., Marshalltown, Ia.
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
MaGirl Foundry and Furnace Works, P. H., Bloomington,
Ill.
McLouth Air Conditioning Corp., Lansing, Mich.
Maple City Furnace Co. Monmouth, Ill.

McLouth Air Conditioning Corp., Lansing, Mich.

Ill.

McLouth Air Conditioning Corp., Lansing, Mich.

Maple City Furnace Co., Monmouth, Ill.

Marshall Furnace Co., Marshall, Mich.

May-Fiebeger Co., Newark, Ohio.

Meyer Furnace Co., Peoria, Ill.

Moncrief Furnace Co., Atlanta, Ga.

Moore Corp., Joliet, Ill.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Mueller Furnace Co., L. J., Milwaukee, Wis.

National Manufacturing & Engineering Co., Detroit.

Nesbitt, Inc., John J., Philadelphia.

Ohio Foundry and Manufacturing Co., Steubenville, O.

City.

1941

Orbon Stove Co., Belleville, III.

Patten Co., J. V., Sycamore, III. (Coal Oil and Gas)

Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland. (Oil)
Pittston Stove Co., Pittston, Pa.
Portland Stove Foundry Co., Portland, Me.

Premier Furnace Co., Dowagiac, Mich.
Quaker Mfg. Co., Chicago.
Rock Island Stove Co., Rock Island, III.
Rome Grader & Machinery Corp., Rome, N. Y. (Gas)

Round Oak Co., Dowagiac, Mich.
Royal Air Conditioning Equip. Co., Alhambra, Cal.
Rudy Furnace Co., Dowagiac, Mich.
St. Clair Foundry Corp., Centralia, III.
Stoux City Foundry and Boiler Co., Sioux City, Ia.
Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow
Pipe & Heater Co., Inc., St. Louis.
Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)

Twentieth Century Heating & Ventilating Co., Akron, O.
Universal Utilities, Crestline, O. (Oil)

Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.

Williamson Heater Co., Cincinnati, O.

Wise Furnace Co., Akron, O.

\*\*OXXth Century Heating & Ventilating Co., Akron, O.

#### HEATING COILS See Coils, Heating

## HEATERS, WATER, OIL-FIRED

 Automatic Humidifier Co., Cedar Falls, Iowa.
 Century Engineering Corporation, Cedar Rapids, Iowa.
 Cleveland Steel Products Corporation, Toridheet Div., Cleveland.

Cleveland.
Gerstein & Cooper Co., South Boston, Mass.

Gillen Company, J. L., Dowagiac, Mich.
Johnson Co., S. T., Oakland, Cal.

Lochinvar Products, Division of Michigan Tank & Furnace Corp., Dearborn, Mich.

Nu-Way Corp., Rock Island, Ill.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Petroleum Heat & Power Co., Stamford, Conn.
Progressive Co., Chicago, Ill.
Scott-Newcomb, Inc., St. Louis.
Wayne Oil Burner Corporation, Fort Wayne, Ind.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

#### HOSE, METAL, FOR ELIMINATING COMPRESSOR VIBRATION

American Metal Hose Branch, American Brass Co., Water-American Metal Hose Branch, American Brass Co., Water bury, Conn.

Atlantic Metal Hose Co., Inc., New York City.

Chicago Metal Hose Corporation, Maywood, Ill.

Belipse Aviation, Div. Bendix Aviation Corp., Bendix, N.

Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

Seamlex Co., Long Island City, N. Y.

Titeflex Metal Hose Co., Newark, N. J.

United Metal Hose Co., Inc., Long Island City, N. Y. Bendix, N. J.

## HOUSINGS, BLOWER

Air Controls, Inc., Cleveland.
Brundage Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co., Youngstown, Ohio.
Detroit Stamping Co., Detroit.
Economy Electric Mfg. Co., Cicero, Ill.
General Blower Corp., San Francisco.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Lau Blower Co., Dayton, Ohio.
National Manufacturing & Engineering Co., Detroit.
Sandberg Sheet Metal Works, Portland, Ore.
Schwitzer-Cummins Co., Indianapolis, Ind.

Schwitzer-Cummins Co., Indianapolis, Ind.
 U. S. Air Conditioning Corp., Minneapolis.
 Viking Air Conditioning Corp., Cleveland.

#### HOUSINGS, FAN, PROPELLER

• Commercial Shearing & Stamping Co., Youngstown, Ohio. (Venturi type)

> HUMIDIFIER FITTINGS See Fittings, Humidifier, Water Line

> **HUMIDIFIER VALVES** See Valves, Humidifier, Water Level

#### HUMIDIFIERS, FURNACE, EVAPORATION, AUTOMATIC

Agricola Furnace Co., Inc., Gadsden, Ala. American Air Conditioning Co., Minneapolis, Minn. • American Foundry & Furnace Co., Bloomington, Ill.

American Furnace & Foundry Co., Milan, Mich.
American Humidaire Corp., Grand Rapids, Mich.
Automatic Humidifler Co., Cedar Falls, Ia.
Badger Mfg. & Sales Co., Milwaukee.
Barclay, Inc., Robert, Chicago.
Bishop Humidifler Co., Detroit, Mich.
Bryant Heater Co., Cleveland, O.
Calesco Corporation, Lynn, Mass.
Cary Mfg. Co., Waupaca, Wis.
Chandler Co., Cedar Rapids, Ia.
Comfort Products Corporation, Harvey, Ill.
Des Moines Stove Repair Co., Des Moines, Ia.
Gardner Manufacturing Co., Horicon, Wis.
Glasby Manufacturing Company, Inc., J. P., Bloomfield,
N. J.

Gardner Manufacturing Co., Horicon, Wis.
Glasby Manufacturing Company, Inc., J. P., Bloomfield,
N. J.
Green Colonial Furnace Co., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Health-O-Mist Humidifier Mfg. Co., Columbus, Wis.
Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Hudson-Root Company, Brocton, N. Y.
Ideal Furnace Co., Detroit, Mich.
Iowa Foundry Co., Sloux City, Ia.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kleenaire Corp., Stevens Point, Wis.
Kraker, Henry, Holland, Mich.
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., H. C., San Rafael, Cal.
McDonnell & Miller, Chicago, Ill.
Marshall Furnace Co., Marshall, Mich.
Mayflower Air-Conditioners, Inc., St. Paul.
Meyer Furnace Co., Peoria, Ill.
Monmouth Products Co., Cleveland, O.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nugent Sons, Inc., Thos., New York City.
Patten Co., J. V., Sycamore, Ill.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pfening Co., Fred D., Columbus, Ohio.
Premier Furnace Co., Dowagiac, Mich.
Richardson & Boynton Co., New York City.
Roberts-Hamilton Co., Minneapolis, Minn.
Rockford Brass Works, Rockford, Ill.
Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Sallada Mfg. Co., Minneapolis, Minn.
Scoville Manufacturing Co, Morency - Van Buren Div.,
Sturgis, Mich.
Security Stove & Mfg. Co., Kansas City, Mo.
Sioux City Foundry and Boiler Co., Sloux City, Ia.
Skilbeck Mfg. Co., Kenosha, Wis.
Skuttle Co., J. L., Detroit, Mich.
Somers, Inc., H. J., Detroit, Mich.
Somers, Inc., H. J., Detroit, Mich.
Thatcher Furnace Co., Seattle, Wash.
Wise Furnace Co., Akron, O.

## HUMIDIFIERS, FURNACE, SPRAY, AUTOMATIC

Air Controls, Inc., Cleveland, O.
American Foundry & Furnace Co., Bloomington, Ill.
American Radiator and Standard Sanitary Corp., New York

American Foundry & Furnace Co., Bloomington, III.
American Radiator and Standard Sanitary Corp., Ne City and Pittsburgh.
Binks Mfg. Co., Chicago, III.
Bishop & Babcock Mfg. Co., Cleveland, O. Brundage Co., Kalamazoo, Mich.
Chelsea Fan & Blower Co., Inc., New York City.
Handelan Washed Air Co., Minneapolis, Minn.
McLouth Air Conditioning Corp., Lansing, Mich.
Marshall Furnace Co., Marshall, Mich.
Mayflower Air-Conditioners, Inc., St. Paul
Meyer Furnace Co., Peoria, III.
Olsen Mfg. Co., C. A., Elyria, O.
Payne Furnace & Supply Co., Beverly Hills, Cal.
Rega Mfg. Co., Rochester, N. Y.
Somers, Inc., H. J., Detroit, Mich.
Southworth Machine Co., Portland, Me.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Company, Chicago.
Supreme Electric Products Corp., Rochester, N. Y.
Thatcher Furnace Co., Newark, N. J.
United American Bosch Corp., Springfield, Mass.
U. S. Air Conditioning Corp., Minneapolis, Minn.

#### HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

Alter Co., Harry, Chicago.
Betz Air Conditioning Corp., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
Certified Products Co., Toledo, Ohio.
Coolmaster Corp., Chicago.
Corozone Air Conditioning Corp., Cleveland.
Cugley Incubator Co., Elkhart, Ind.
Fairbanks, Morse & Co., Chicago.
Hugo Mfg. Co., Duluth, Minn.
Kauffman Air Conditioning Corp., St. Louis.
Lion Mfg. Corp., Chicago.

Little Giant Vaporizer Co., Oklahoma City, Okla. (Vaporizer)
Lohman, Inc., Wm. J. New York City.
Lowell Air Conditioning Corp., Philadelphia.
Norwood Filtration Co., The, Florence, Mass.
Skilbeck Mfg. Co., Kenosha, Wis.
Somers, Inc., H. J., Detroit.
Southworth Machine Co., Portland, Me.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Standard Engineering Works, Pawtucket, R. I.
Steamair Co., Cincinnati, Ohio.

OU. S. Air Conditioning Corp., Minneapolis, Minn.
Vigor-Aire Corp., Philadelphia.

#### **HUMIDISTATS**

d,

iv.,

York

atina)

1941

American Moistening Co., Providence, R. I.
Au-Temp-Co Corp., New York City.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.

Obetroit Lubricator Co., Detroit, Mich.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore. (Human hair)
General Electric Co., Bloomfield, N. J.
G. M. Manufacturing Co., New York City.
H-B Instrument Co., Inc., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis. (Wood, Hair, Membrane)

brane)
Leeds & Northrup Co., Philadelphia.

• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
(Human hair)

(Human hair)
Parks-Cramer Co., Fitchburg, Mass.

enn Electric Switch Co., Goshen, Ind.
Powers Regulator Co., Chicago.
Spencer Thermostat Co., Attleboro, Mass.
Standard Engineering Works, Pawtucket, R. I.
Tagliabue Mfg. Co., C. J., Brooklyn.
Taylor Instrument Companies. Rochester, N. Y.

White-Rodgers Electric Co., St. Louis.

## **HUMIDITY CONTROLS**

See Humidistats

## **HUMIDITY RECORDERS**

See Recorders, Humidity

### **HYGROMETERS**

HYGROMETERS

American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Fee and Stemwedel, Inc., Chicago.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore.
G. M. Manufacturing Co., New York City.
H. B. Instrument Co., Inc., Philadelphia.
Hill Co., E. Vernon, Chicago.
International Moistening Co., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., American Schaeffer & Budenberg Instrument Div., Bridgeport, Conn.
Moeller Instrument Co., Richmond Hill, New York City.
Palmer Co., Cincinnati.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer and Instrument Co., Philadelphia.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit.
Tagliabue Mfg. Co., C. J., Brooklyn.
Tavlor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit.
Weksler Thermometer Corp., New York City.

#### INDICATORS, SOUND LEVEL

General Electric Co., Schenectady, N. Y.

#### INSULATION, BUILDING

Asbestos Covering & Flooring Co., Chicago, Ill. Acme Asbestos Covering & Flooring Co., Chicago, III. (Rockwool)
Air-O-Cell Industries, Inc., Detroit.
Alfol Insulation Co., Inc., New York City. (Blanket)
Alton Mineral Wool Insulation Co., Alton, III.
Aluminum Aircell Insulation Co., Detroit.
Aluminum Company of America, Pittsburgh. (Reflective)
American Flange & Mfg. Co., Inc., New York City. (Metal Sheets) American Hair & Felt Co., Chicago. (Hair felt)

Armstrong Cork Co., Lancaster, Pa. (Cork)
Bache & Co., Semon, New York City. (Glass)
Baldwin-Hill Co., Trenton, N. J. (Rockwool)
Barrett Co., New York City. (Tar felt and rockwool)
Berry Jr. & Co., Inc., F. E., Everett, Mass.
Blocksom & Company, Michigan City, Ind.
Butterworth Jr., B. T., New Canaan, Conn. (Cork)
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O. (Rock wool)
Carney Rockwool Co., Mankato, Minn. (Granulated and Batt) Batt) Celotex Corp., Chicago, Ill.
Certain-teed Products Corp., New York City. (Rigid fibre)
Chamberlin Metal Weather Strip Co., Detroit. (Rock wool)
Coast Insulating Corp., Los Angeles. (Rockwool Batts, Fill) Cork Import Corp., New York City. (Corkboard) Cork Insulation Co., New York City. (Cork) Crown Cork & Seal Co., Baltimore. Doheny Co., John J., Belmont, Mass. (Blanket)
Dry-Zero Corporation, Chicago.
Eagle Picher Lead Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard) fibreboard)
Flintkote Co., New York City. (Fibre board and rock wool)
Ford Roofing Products Co., Chicago. (Board and rock wool)
General Insulating & Mfg. Co., Alexandria, Ind.
General Insulating Products Co., Brooklyn, N. Y.

Grant Wilson, Inc., Chicago (Rock Wool)
Hinde & Dauch Paper Co., Sandusky, O.
Insul-Wool Insulation Corp., Wichita, Kansas.
Insulite Co., Minneapolis, Minn. (Wood fibre)
International Vermiculite Co., Springfield, Ill. (Loose fill)
Jiffy Manufacturing Co., Hillside, N. J. (Blanket)
Johns-Manville, New York City. (Rock wool, fibre board)
Johnston Tin Foil & Metal Co., St. Louis. (Paper backed
foil)
Keasbey Co., Robert A., New York City. (Rock wool) foil)
Keasbey Co., Robert A., New York City. (Rock wool)
Keasbey & Mattison Co., Ambler, Pa. (Mineral wool)
Kennedy, Inc., David E., Brooklyn, N. Y. (Board)
Kimberly-Clark Corp., Chicago.
Marblehead Lime Co., Chicago. (Rock wool)
Masonite Corp., Chicago, Ill. (Wood fibre)
Masonite Corp., Cellufoam Products Div., Chicago.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Mitchell & Smith, Inc., Detroit. (Cork)
Multi-Cell Sales Corp., Minneapolis. (Used Newspaper Quilted) Quilted) Quilted)
Mundet Cork Corp., New York City. (Cork)
Munn and Steele, Inc., Newark, N. J. (Mica)
National Gypsum Co., Buffalo, N. Y.
Pacific Lumber Co., San Francisco, Cal. (Loose fill)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Plastergon Wall Board Co., Buffalo. (Rigid Board)
Poe Co., C. W., Cleveland. (Mineral Wool)
Refractory & Insulation Corp., New York City. (Loose granulated)
Revnolds Metals Co., Inc., Richmond, Va. (Reflective) Reynolds Metals Co., Inc., Richmond, Va. (Reflective) Riverton Lime & Stone Co., Inc., Riverton, Va. (Mineral Wool) Wool)
Robinson Insulation Co., Great Falls, Mont. (Fill)
Rock Fleece Co., El Paso, Texas.
Rock Wool Products Co., Inc., Wabash, Ind. (Loose fill)
Ruberold Co., New York City. (Rock wool)
Russell Co., F. C., Cleveland, O.,
Samson Plaster Board Co., Buffalo. (Fill, bats, blankets,
foll, board)
Senece Rock Wool Co., Tiffin Oblo. (Fill) Seneca Rock Wool Co., Tiffin, Ohio. (Fill)
Specialty Converters, Inc., East Braintree, Mass. (Reflective) Sprayo-Flake Co., Chicago, Ill. Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt) Standard Lime & Stone Co., Baltimore, Md. (Rock wool) Standard Rolling Mills Incorporated, Brooklyn. (Refi tive)
Tennessee Products Corp., Nashville, Tenn. (Mineral Wool)
Therminsul Corp. of America, Kalamazoo, Mich. (Bats, bulk. Truscon Steel Co., Youngstown, O. (Board between metal Truscon Steel Co., Youngstown, O. (Board between metal sheets)
Union Rock Wool Corp., Wabash, Ind. (all types)
United Cork Companies, Kearney, N. J.
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., Chicago, (Rock wool)
U. S. Rock Wool Co., Salt Lake City (Granulated, Batt and Blanket)
Universal Gypsum & Lime Co., Chicago, (Loose fill) Universal Gypsum & Lime Co., Chicago. (Loose fill) Universal Zonolite Insulation Co., Chicago. (Loose Fill, Universal Zonolite Insulation Co., Chicago. (Loose Fili, Plaster)
Unson Co., Lockport, N. Y.
Waukesha Lime & Stone Co., Waukesha, Wis. (Rock Wool batts and bulk)
Western Mineral Products Co., Omaha, Nebr. (Fill)
Western Rock Wool Corp., Huntington, Ind. (Fill)
Wilson & Co., Inc., Chicago, Ill. (Haircraft)

Wilson, Inc., Grant, Chicago, Ill. (Rock Wool)
Wood Conversion Co., St. Paul, Minn. (Board and blanket)

#### INSULATION, DUCT, SOUND DEADENING

INSULATION, DUCT, SOUND DEADENING
American Hair & Felt Co., Chicago, Ill.
Baldwin-Hill Company, Trenton, N. J.
Barrett Co., New York City.
Berry, Jr., & Co., Inc., F. E., Everett, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Cincinnati, O.
Celotex Corp., Chicago, Ill.
Felters Co., Inc., Boston, Mass.
Grant Wilson, Inc., Chicago.
Johns-Manville, New York City.
Masonite Corporation, Chicago. (Wood fibre)
Masonite Corp., Cellufoam Products Div., Chicago.
Maxim Silencer Co., Hartford, Conn.
Mortell Co., J. W., Chicago, Ill. (Adhesive)
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Owens-Corning Fiberglas Corporation. Toledo.
Pacific States Felt & Mfg. Co., Inc., San Francisco.
Plant Rubber & Asbestos Works, San Francisco.
Plant Rubber & Asbestos Works, San Francisco.
Poe Co., C. W., Cleveland.
Seneca Rock Wool Co., Tiffin, Ohio.
Telsit Insulation Co., Bronx, N. Y. (Plastic)
Universal Zonolite Insulation Co., Chicago.
Western Felt Works, Chicago, Ill.
Western Silicair Products, Inc., Burbank, Cal.

#### INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alr-O-Cel Industries, Inc., Detroit.
Alfol Insulation Co., Inc., New York City. (Aluminum foil)
American Flange & Mfg. Co., Inc., New York City.
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Barrett Co., New York City.
Berry Jr. & Co., Inc., F. E., Everett, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co. Philip, Cincinnati, O.
Celotex Corp., Chicago, Ill.
Cork Import Corp., New York City. (Corkboard)
Cork Insulation Co., Inc., New York City. (Cork)
Crown Cork & Seal Co., Baltimore.
Eagle-Picher Lead Co., Cincinnati, O. (Mineral wool, block, blanket) blanket) Ehret Magnesia Mfg. Co., Valley Forge, Pa. Enret Magnesia Mrg. Co., Valley Forge, Pa.
Felters Co., Inc., Boston.
Fir-Tex Insulating Board Co., St. Helens, Ore.
General Insulating Products Co., Brooklyn.
General Insulating & Mfg. Co., Alexandria, Ind.
Grant Wilson, Inc., Chicago.
Insulite Company, Minneapolis.
International Vermiculite Co., Springfield, Ill. (Block and
Cement)
Lohns Manyille, New York City (Rock conk) Cement)

Johns-Manville, New York City. (Rock cork)

Keasbey Co., Robert A., New York City.

Keasbey & Mattison Co., Ambler, Pa. (Asbestos air cell)

Kimberly-Clark Corp., Chicago.

Masonite Corp., Chicago, Ill. (Wood fibre)

Masonite Corp., Cellufoam Products Div., Chicago.

Miller Rubber Company, Inc., Akron, Ohio.

Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)

Mitchell & Smith, Inc., Detroit.

Mundet Cork Corp., New York City. (Cork)

Munn and Steele, Inc., Newark, N. J.

Nelson Mfg. Co., B. F., Minneapolis.

Norristown Magnesia & Asbestos Co., Norristown, Pa.

Owens-Corning Fiberglas Corp., Toledo, Ohio.

Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.

Plant Rubber & Asbestos Works, San Francisco.

Presstite Engineering Co., St. Louis, Mo.

Refractory & Insulation Corp., New York City. (Inside Duct Lining)

Rock Wool Products Co., Inc., Wabash, Ind. Duct Lining)

Rock Wool Products Co., Inc., Wabash, Ind.
Ruberoid Co., New York City. (Air cell)
Russell Co., F. C., Cleveland, Ohio.

Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Jollet, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Telsit Insulation Co., Bronx, N. Y.
Therminsul Corp., Kalamazoo, Mich. (Block rock wool)
United Cork Companies, Kearney, N. J.
United States Mineral Wool Co., Chicago.
Universal Zonolite Insulation Co., Chicago.
Western Felt Works, Chicago, Ill.
Wilson & Co., Inc., Chicago, Ill.
Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

## INSULATION, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago.
Alfol Insulation Co., Inc., New York City.
Aluminum Aircell Insulation Co., Detroit. (Asbestos)
Baldwin-Hill Co., Trenton, N. J. (Asbestos cement)
Carey Co., Philip, Lockland, Cincinnati, O.
Coast Insulating Corp., Los Angeles. (Rock Wool Cement)
Eagle Picher Lead Co., Cincinnati, O. (Blocks)

Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Insulating & Mfg. Co., Alexandria, Ind. (Blanket)
Grant Wilson, Inc., Chicago.
International Vermiculite Co., Springfield, Ill.
Johns-Manville, New York City. (All types)
Keasbey Co., Robert A., New York City (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago (Asbestos, mineral wool)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Munn and Steele, Inc., Newark, N. J.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Refractory & Insulation Corp., New York City.
Robinson Insulation Co., Great Falls, Mont.
Rock Wool Products Co., Inc., Wabash, Ind. (Rock wool)
Ruberoid Co., New York City. (Blocks, Asbestos Cement)
Schundler & Co., Inc., F. E., Jollet, Ill.
Smidth & Co., F. L., New York City.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore. (Blankets, Cement)
Telsit Insulation Co., Bronx, N. Y.
Therminsul Corp., Kalamazoo, Mich. (Block rock wool.)
United States Mineral Wool Co., Chicago.
Universal Zonolite Insulation Co., Chicago. (Cements, blocks)

Wilson, Inc., Grant, Chicago, Ill. blocks) Wilson, Inc., Grant, Chicago, Ill.

#### LEADER STRAPS See Fittings and Accessories, Conductor

#### LIFTS, SKYLIGHT

Biersach & Niedermeyer Company, Milwaukee.
California Cornice, Steel & Supply Corp., Los Angeles.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Dayton Greeenhouse Mfg. Co., Dayton, O.
Hudson Equipment Corp., Minneapolis, Minn.
Levow, David, New York City. (Gearing)
Park City Cornice Works, Inc., Bridgeport, Conn.
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
Schoedinger, F. O., Co., Columbus, O.
Van Noorden Co., E., Boston, Mass.
Weiss & Co., H., New York City.
Willis Mfg. Co., Galesburg, Ill.

#### LIGHTERS, FURNACE FIRE

American Furnace Lighter Sales Co., St. Louis.

#### LOUVRES AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

Air Control Products, Inc., Muskegon, Mich.

Air Controls, Inc., Cleveland.
Air Conditioning Products Co., Detroit, Mich.
Air Conditioning Products Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.

Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.

American Warming & Ventilating Co., Toledo, O.
Ames Co., W. R., San Francisco, Cal.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit. (Motor operated)
Belco Exhaust Fan Mfg. Co., St. Louis.

Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
California Cornice, Steel & Supply Corp., Los Angeles.
Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Chicago Metal Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York City.
Clay Equipment Corp., Cedar Falls, Ia.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago.

Elgo Shutter & Mfg. Co., Detroit, Mich.
Falstrom Co., Passaic, N. J.
General Blower Co., Detroit, Mich.
Falstrom Co., Passaic, N. J.
General Regulator Corp., Chicago, Ill.
Gillian Mfg. Co., Detroit.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hunter Fan & Ventilating Co., Memphis, Tenn.
International Engineering, Inc., Dayton, O.
International Engineering, Inc., Dayton, O.
International Esel Company, Evansville, Ind.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Fan & Blower Corp., Chicago, Ill.
Johnston Co., Wm. W., Dayton, O.
Jordan & Co., Paul R., Indianapolis, Ind.
Kelvin-White Co., Boston, Mass.
King Ventilating Co., Ciceano, Chicago.

Index to Advertisers, page 304

Lockjoint Wood Products Co., Wichita, Kan. (Wood; stationary door, wall, window and ceiling)
Lohman, Inc., William J., New York City.
Martin Metal Mfg. Co., Wichita, Kan.
Meier Electric & Machine Co., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Pittsburgh, Pa.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger Co., F. O., Columbus, O.
Signal Electric Mfg. Co., Menominee, Mich.
Snoair Company, Dallas, Texas.

Standard Stamping & Perforating Co., Chicago.
Supreme Heater & Ventilating Corp., St. Louis.

Tuttle & Balley, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.

Utility Fan Corporation, Los Angeles, Cal.
Van Noorden Co., E., Boston, Mass.

Waterloo Register Co., Waterloo, Ia.

Wills Mfg. Co., Galesburg, Ill.

nt)

nts.

1941

#### MACHINERY, REBUILT AND USED

◆General Blower Co., Chicago.
◆Interstate Machinery Co., Inc., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
◆Osborn Co., J. M. & L. A., Cleveland, O. St. Louis Tool Co., St. Louis.

#### MACHINES, BAR FOLDERS, HAND

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 St. Louis Tool Co., St. Louis.

#### MACHINES, BAR FOLDERS, POWER

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, BEADING, HAND

Niagara Machine & Tool Works, Buffalo.
Packham Crimper Co., Mechanicsburg, Ohio.
Peck, Stow & Wilcox Co., Southington, Conn.

Robertson, F. L., Buffalo, N. Y.

## MACHINES, BEADING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Swain Mfg. Co., Fred J., St. Louis.
Yoder Company, Cleveland, O.

#### MACHINES, BURRING, HAND

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.

#### MACHINES, BURRING, POWER

Cincinnati Electrical Tool Co., The, Cincinnati, O. Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn. Stow Mfg. Co., Binghamton, N. Y.

### MACHINES, CLEAT BENDING, HAND

•R. E. Smith, Waukegan, Ill.

## MACHINES, COMBINATION, HAND

(Beading, Burring, Turning, Wiring, etc.)

Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.

Packham Crimper Co., Mechanicsburg, Ohio. (Peck, Stow & Wilcox Co., Southington, Conn. (Beading)

#### MACHINES, COMBINATION, POWER

(Beading, Burring, Turning, Wiring, etc.)

Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Yoder Co., Cleveland, O.

#### MACHINES, CRIMPING, HAND

Niagara Machine & Tool Works, Buffalo.
 Packham Crimper Co., Mechanicsburg, Ohio.
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, CRIMPING, POWER

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 Yoder Co., Cleveland, O.

### MACHINES, DOUBLE SEAMER, ROOF, POWER

Maxfield Manufacturing Co., Temple, Tex.

#### MACHINES, ELBOW, HAND

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.

#### MACHINES, ELBOW, POWER

Ingels Elbow Machine Corp., Chicago, Ill.
Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Whitney Metal Tool Co., Rockford, Ill.

## MACHINES, FLANGING, HAND

Binkley Mfg. Co., Warrenton, Mo.
Lockformer Co., Chicago.
Maplewood Machinery Co., Inc., Chicago.
Niagara Machine & Tool Works, Buffalo.
"Original" Metal Flanging Machine Works, Seattle, Wash. Packham Crimper Co., Mechanicsburg, Ohio.
Peck, Stow & Wilcox Co., Southington, Conn.
Ward Machinery Co., Chicago, Ill.
Weiss & Co., H., New York City.

### MACHINES, FLANGING, POWER

MACHINES, FLANGING, POWER

Bittner Engineering Co., New York City.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Engineering and Research Corporation, Riverdale, Md.

•Lockformer Co., Chicago.
Maplewood Machinery Co., Inc., Chicago.

•Niagara Machine & Tool Works, Buffalo.

"Original" Metal Flanging Machine Works, Seattle, Wash.
Peck. Stow & Wilcox Co., Southington, Conn.

•Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Swain Mfg. Co., Fred J., St. Louis.
Yoder Co., Cleveland, O.

#### MACHINES, GROOVING, HAND

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, GROOVING, POWER

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 Yoder Co., Cleveland, O.

#### MACHINES, GUTTER FORMING, HAND

•Robertson, F. L., Buffalo, N. Y.

## MACHINES, NIBBLING, HAND

National Machine Tool Co., Racine, Wis.

#### MACHINES, NIBBLING, POWER

Campbell, Andrew C., Div. of American Chain & Cable Co.,
Inc., Bridgeport, Conn.

•Libert Machine Co., Green Bay, Wis.
St. Louis Tool Co., St. Louis.
Savage Co., W. J., Knoxville, Tenn.

#### MACHINES, PIPE, LOCK FORMING, POWER Maplewood Machinery Co., Inc., Chicago.

## MACHINES, PITTSBURGH LOCK FORMING

Binkley Mfg. Co., Warrenton, Mo.
 Lockformer Co., Chicago, Ill.
 Maplewood Machinery Co., Inc., Chicago.
 Rafter Machine Co., Belleville, N. J.
 Ward Machinery Co., Chicago, Ill.
 Whitney Metal Tool Co., Rockford, Ill.

#### MACHINES, PITTSBURGH LOCK OPENERS Atlas Machine & Tool Co., Portland, Ore.

#### MACHINES, ROLLING, CRIMPING, BEADING, **POWER**

Maplewood Machinery Co., Inc., Chicago.

#### MACHINES, SEAMING, HAND

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 Weiss & Co., H., New York City.

## MACHINES, SEAMING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Swain Mfg. Co., Fred J., St. Louis.
Yoder Co., Cleveland, O.

## MACHINES, SETTING DOWN, HAND

Niagara Machine & Tool Works, Buffalo. Peck, Stow & Wilcox Co., Southington, Conn.

#### MACHINES, SETTING DOWN, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, SHEET METAL SHRINKING, POWER

Engineering and Research Corporation, Riverdale, Md.

## MACHINES, SLIP ROLL FORMING, HAND

Bertsch & Co., Cambridge City, Ind. Hendley & Whittemore Co., Beloit, Wis. Niagara Machine & Tool Works, Buffalo. Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, SLIP ROLL FORMING, POWER

Bertsch & Co., Cambridge City, Ind.
Hendley & Whittemore Co., Beloit, Wis.
Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

#### MACHINES, SLITTING, HAND

Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo.
Hendley & Whittemore Co., Beloit, Wis.

Kidder Mfg. Co., Inc., J. F., Burlington, Vt.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.

Ward Machinery Co., Chicago, Ill.

#### MACHINES, SLITTING, POWER

Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Hendley & Whittemore Co., Beloit, Wis.

Libert Machine Co., Green Bay, Wis. (Rotary)
Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Rafter Machine Co., Belleville, N. J.
St. Louis Tool Co., St. Louis.
Yoder Co., Cleveland, O.

## MACHINES, SQUARING, POWER

Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, WIRING, HAND

Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

## MACHINES, WIRING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y. Cleveland Punch & Shear Works Co., Cleveland, O. Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

Quickwork-Whiting Div., Whiting Corp., Harvey, Ill. Yoder Company, Cleveland, O.

Yoder Company, Cleveland, O.

#### MALLETS, METAL WORKING

Bersted Co., Martin, Chicago, Ill. (Molded composition)
Chicago Rawhide Mfg. Co., Chicago, Ill.
Electric Materials Co., North East, Pa. (Copper)
Fowler-Pem Co., Emeryville, Cal.
Greene, Tweed & Co., New York City.
Miller Rubber Co., Inc., Akron, O. (Composition)

Niagara Machine & Tool Works, Buffalo. (Hickory)
Peck, Stow & Wilcox Co., Southington, Conn. (Wood)
Reiner & Campbell, Inc., New York City.
Stanley Tools, New Britain, Conn. (Soft face hammers, hickory, rubber composition)

hickory, rubber composition)

## METALS, PERFORATED, SHEET AND PLATE

Chase Brass & Copper Co., Inc., Waterbury, Conn. Chicago Perforating Co., Chicago III.
Cross Engineering Co., Carbondale, Pa.
Crucible Steel Co. of America, New York City.
Diamond Manufacturing Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Fairmont Aluminum Co., Fairmont, W. Va.
Gillian Mfg. Co., Detroit.

Harrington & King Perforating Co., Chicago, III.
Hendrick Mfg. Co., Carbondale, Pa.

International Nickel Co., Inc., New York City. (Monel and nickel)

Johnston & Chapman Co., Chicago, Ill.

Littleford Bros., Cincinnati, O.

Manhattan Perforated Metal Co., Inc., Long Island City,

N. Y.

Martin Metal Mfg. Co., Wichita, Kan.

Mundt & Sons, Charles, Jersey City, N. J.

Nortmann-Duffke Co., Milwaukee Wis.

Reliable Perforating Co., Chicago, Ill.

Revere Copper and Brass Incorporated, New York City.

Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow

Plpe & Heater Co., Inc., St. Louis.

Standard Stamping & Perforating Co., Chicago, Ill.

Western Wire & Iron Works, Inc., Chicago, Ill.

Wickwire Spencer Steel Co., New York City.

METAL SPRAY GUNS See Guns, Spray, Metals

METAL STAMPINGS See Stampings, Metal

## METERS, AIR VELOCITY, DIRECT READING

Detroit Air Meter Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.

•Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies Rochester, N. Y.

#### MOTORS, DAMPER, DUCT, MODULATING OR PROPORTIONING

Au-Temp-Co Corp., New York City.
Automatic Temperature Control Co., Inc., Philadelphia.
Barber-Colman Co., Rockford, Ill.
Janette Mfg. Co., Chicago, Ill.

Mercoid Corp., Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Russell Electric Co., Chicago, Ill.

White Manufacturing Co., St. Paul, Minn.

## MOTORS, DAMPER, DUCT, TWO-POSITION

Au-Temp-Co. Corp., New York City.

Automatic Products Co., Milwaukee, Wis.
Automatic Temperature Control Co., Inc., Philadelphia.
Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Chicago, Ill.

Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.
Janette Mfg. Co., Chicago, Ill.

Mercoid Corp., Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Russell Electric Co., Chicago.

Sampsel Time Control, Inc., Spring Valley, Ill.
Sheer Co., H. M., Quincy, Ill.

White Manufacturing Co., St. Paul, Minn.

## MOTORS, DAMPER, FURNACE DRAFT, ELECTRICAL

MOTORS, DAMPER, FURNACE DRAFT, ELECTRICAL
Au-Temp-Co. Corp., New York City.

•Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Barclay, Inc., Robert, Chicago.
Cook Electric Co., Chicago, Ill.
Crise Electric Mfg. Co., Mount Vernon, O.
Defender Automatic Regulator Co., St. Louis.
•Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.
•General Controls Co., Glendale, Cal.
Gleason-Avery, Inc., Auburn, N. Y.
Janette Mfg. Co., Chicago, Ill.
•Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
•Pern Electric Switch Co., Goshen, Ind.
•Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Division, Master Electric Co., Dayton, O.

ton, O.
Russell Electric Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Company, Attleboro, Mass.
White Manufacturing Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis.

## MOTORS, ELECTRIC, FRACTIONAL H. P.

Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill. (A. C.)
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O
Canatsey Electric Mfg. Co., Kansas City, Mo.

Ocentury Electric Co., St. Louis, Mo.

Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.

Obelco Products Dvision, General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.

Emerson Electric Mfg. Co., St. Louis, Mo.
General Electric Co., Schenectady, N. Y.

Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co, Dayton, O
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Reynolds Electric Company, Chicago.
Robbins & Myers, Inc., Springfield, O.
Russell Electric Co., Chicago.
Speedway Mfg. Co., Cicero, Ill.
Sterling Electric Motors. Inc., Los Angeles.
Sturtevant Co., B. F., Hyde Park, Boston.
U. S. Electrical Motors, Inc., Los Angeles.
Victor Electric Products, Inc., Cincinnati, O.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

nd

ty,

ay-

0.

941

### MOTORS, ELECTRIC, I H. P. AND OVER

Allis Co., Louis, Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis
Baldor Electric Co., St. Louis, Mo.
Bogue Electric Co., Paterson, N. J.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Erie, Pa.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J.
Obelco Products Division, General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Electric Machinery Mfg. Co., Minneapolis.
Emerson Electric Mfg. Co., St. Louis,
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Chicago, Ill.
Leland Electric Co., Chicago, Ill.
Leland Electric Co., Chicago, Ill.
Leland Electric Co., Dayton, O.

Lincoln Electric Co., Dayton, O.

Lincoln Electric Co., Dayton, O.
Peerless Electric Co., Dayton, O.
Peerless Electric Co., Dayton, O.
Peerless Electric Co., Warren, O.
Philadelphia Gear Co., Philadelphia, (Geared)
Reliance Elec. & Eng. Co., Cleveland.
Robbins & Myers, Inc., Springfield, O.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles.

Sturtevant Co., B. F., Hyde Park, Boston.
U. S. Electrical Motors, Inc., Los Angeles.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Zobell Electric Motor Corp., Garwood, N. J.

# MOULDING AND TRIM, ORNAMENTAL, for CABI-NETS and CASINGS

Alden Manufacturing Co., Painesville, O.
Alimetal Weatherstrip Co., Chicago, Ill.
Aluminum Co. of America, Pittsburgh, Pa.
Aluminum Goods Mfg. Co., Manitowoc, Wis.
Brasco Manufacturing Co., Harvey, Ill.
Briggs Mfg. Co., Detroit.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Detroit Moulding Div., Detroit.
Empire Door Co., Inc., New York City.
Friedley-Voshardt Co., Chicago, Ill.
Green Mfg. Co., Chicago.
Herron-Zimmers Moulding Co., Detroit, Mich.
Jamestown Metal Corp., Jamestown, N. Y.
Kawneer Co., Niles, Mich.
Ladon Co., Chicago.

Lu Blower Co., Dayton, O.
Ledkote Products Co., Long Island City, N. Y.
Lees, John, Div. Serrick Corp., Muncle, Ind.
Martin-Parry Corp., York, Pa.
Maysteel Products, Inc., Mayville, Wis.
Mesker & Co., Geo. L., Evansville, Ind.
Miller & Doing, Inc., Brooklyn, N. Y.
Pyramid Metals Company, Chicago, Ill.
United Metal Prod. Div., Canton, Ohio.

## NAILS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa. Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. Hassall, Inc., John, Brooklyn, N. Y. Townsend Co., New Brighton, Pa.

## NAILS, COPPER

American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
•Columbia Steel Co., San Francisco, Cal.
Copperweld Steel Co., Glassport, Pa.
Downs-Smith Brass & Copper Co., New York City.
Hassall, Inc., John, Brooklyn, N. Y.
•Hussey & Co., C. G., Pittsburgh, Pa.
Maze Co., W. H., Peru, Ill.
Royal Metal Products Co., Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

## NAILS, HARDENED MASONRY

American Steel & Wire Co., Chicago, Ill. Parker-Kalon Corp., New York City. Rawlplug Co., Inc., New York City. Townsend Co., New Brighton, Pa. Wheeling Corrugating Co., Wheeling, W. Va. Wheeling Steel Corp., Wheeling, W. Va.

#### NAILS, ROOFING

NAILS, ROOFING

American Rolling Mill Co., Middletown, O.
American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Columbia Steel Corp., Kokomo, Ind.
Continental Steel Corp., Kokomo, Ind.
Deniston Co., Chicago, Ill.
Dickson Weatherproof Nail Co., Evanston, Ill. (Lead headed)
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Guif States Steel Co., Birmingham, Ala.
Hassall, Inc., John, Brooklyn, N. Y.
Hussey & Co., C. G., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lehon Co., Chicago.
Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H., Peru, Ill.
Milcor Steel Co., Milwaukee, Wis.
National Lead Co., New York City.
Republic Steel Corp., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

## NAILS, SCREW, HARDENED

Jones & Laughlin Steel Corp., Pittsburgh.
National Screw & Mfg. Co., Cleveland, O.

Parker-Kalon Corp., New York City.

Republic Steel Corp., Cleveland, O.
Townsend Co., New Brighton, Pa.

## NAILS, STAINLESS STEEL

Allegheny Ludium Steel Corp., Brackenridge, Pa. Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. Crucible Steel Co. of America, New York City. Hassall, Inc., John, Brooklyn, N. Y. National Screw & Mfg. Co., Cleveland.

Republic Steel Corp., Cleveland, O. Townsend Co., New Brighton, Pa. Turner & Seymour Mfg. Co., Torrington, Conn.

### NAILS, ZINC COATED

American Steel & Wire Co., Chicago, Ill.
American Zinc Products Co., Greencastle, Ind.
Angell Nall & Chaplet Co., Cleveland, O.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Corp., Kokomo, Ind.
Hassall, Inc., John, Brooklyn, N. Y.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lehon Co., Chicago.
Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H., Peru, Ill.
Republic Steel Corporation, Cleveland.
Townsend Co., New Brighton, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

#### NIGHT AIR FANS See Fans, Night Air Cooling

## NOZZLES, SPRAY, WATER

NOZZLES, SPRAY, WATER

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. Balloffett Dies & Nozzle Co., Inc., Guttenberg, N. J. Benjamin Air Rifie Co., St. Louis.
Betz Air Conditioning Corp., Kansas City, Mo. Binks Mfg. Co., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.

Clarage Fan Co., Kalamazoo, Mich.

Detroit Lubricator Co., Detroit.
Eclipse Air Brush Co., Inc., Newark, N. J.
Link-Belt Co., Chicago.

Marley Co., Kansas City, Kan.
Martocello & Co., Jos. A., Philadelphia, Pa.,
Monarch Mfg. Works, Inc., Philadelphia, Pa.,
Peterson "Freezem" Mfg. & Sales Co., Kansas City, Mo.
Philips Cooling Tower Co., Inc., New York City.
Rega Mfg. Co., Rochester, N. Y.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Chicago, Ill.
Spray Wheel Air Conditioners, Inc., Denver, Colo.
Strandwitz & Co., Inc., W. J., Camden, N. J.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Electric Products Corp., Rochester, N. Y.
Yarnall-Waring Company, Philadelphia.

NUTS, SHEET METAL Tinnerman Products, Inc., Cleveland.

> OFFSETS, FURNACE PIPE See Fittings and Accessories, Furnace Pipe

> > OIL BURNERS See Burners, Oil

#### **OZONE APPARATUS**

American Hydrozone Co., Inc., Jersey City, N. J. Automatic Pump & Softener Corp., Rockford, Ill. Chelsea Fan & Blower Co., Inc., New York City. Corozone Air Conditioning Corp., Cleveland, O. Electroaire Corp., Chicago, Ill. Kisco Company, Inc., St. Louis. Lohman, Inc., Wm. J., New York City. Montgomery Bros., San Francisco, Cal. Norwood Filtration Co., The, Florence, Mass. Ozone Air Company, Grand Rapids, Mich. Ozo-Ray Process Corp., Chicago. Sealkote Corp., Chicago, Ill. United States Ozone Co. of America, Scottdale, Pa.

#### PAINT, ALUMINUM

PAINT, ALUMINUM

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland, O.
Allen Co., L. B., Chicago.
Aluminum Company of America, Pittsburgh, Pa.
Asphalt Products Co., Syracuse, N. Y.
Baer Brothers, New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carter Paint Co., Liberty, Ind.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Cork Import Corp., New York City.
Debevoise Co., Brooklyn, N. Y.
Dragert Co., Inc., C. H., Brooklyn, N. Y.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Ford Roofing Products Co., Chicago.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co. Div. of Glidden Co., Chicago, IllHilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg. Co., Des Moines, Ia.
Koppers Co., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lehon Co, Chicago.
Maas & Waldstein Co., Newark, N. J.
National Mfg. Corp., Tonawanda, N. Y.
Nebel Manufacturing Co., Cleveland.
O'Brien Varnish Co., South Bend, Ind.
Ohmlac Paint & Refining Co., Chicago, Ill.
Presstite Engineering Co., St. Louis.
Pyrolite Products Co., Cleveland. O.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Sherwin-Williams Co., Cleveland.

Technical Coatings, Inc., Brooklyn, N. Y.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit.
Wailes Dove-Hermiston Corp., Westfield, N. J.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.

#### PAINT, CONCRETE, WATERPROOFING

PAINT, CONCRETE, WATERPROOFING

Acme Refining Co., Cleveland, O.
Asphalt Products Co., Syracuse, N. Y.
Baer Brothers, New York City.
Barber Asphalt Corp., Barber, N. J.
Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co. Philadelphia, Pa.
Connors Paint Mfg. Co., Wm., Troy. N. Y.
Continental Products Co., Euclid, Ohio.
Debevoise Co., Brooklyn, N. Y.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Flintkote Co., New York City.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., Cleveland, O.
Goodrich Co., B. F., Akron, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lastik Products Co., Inc., Chicago, Ill.
Paint-Point Corp., Newark, N. J.
Pecora Paint Co., Philadelphia, Pa.
Pyrolite Products Co., Cleveland.
O'Brien Varnish Co., South Bend, Ind.
Ohmlac Paint & Refining Co., Chicago, Ill.
Paint-Point Corp., Newark, N. J.
Pecora Paint Co., Pittsburgh, Pa.
Tropical Products Co., Cleveland.
Tamms Silica Co., Chicago, Ill.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland.
O.
Truscon Laboratories, Detroit, Mich.
Unitad States Gypsum Co., Chicago, Ill.
Walles Dove-Hermiston Corp., Westfield, N. J.
Wilhelm Co., A., Reading Pa.
X-Pando Corp., Long Island City, N. Y. Wilhelm Co., A., Reading Pa. X-Pando Corp., Long Island City, N. Y.

#### PAINT, COPPER

American Coppercote, Inc., Brooklyn, N. Y. Baer Brothers, New York City. Debevoise Co., Brooklyn, N. Y. Glidden Company, Cleveland. Sherwin-Williams Co., Cleveland.

## PAINT, CRACKLE FINISH

Baer Brothers, New York City.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hilo Varnish Corp., Brooklyn.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg Co., Des Moines, Ia.
Maas & Waldstein Co., Newark, N. J.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Sherwin-Williams Co., Cleveland.
Tropical Paint & Oil Co., Cleveland.
Tropical Paint & Oil Co., Cleveland.
Wattenamel Co., Summit, Ill.
Wilhelm Co., A., Reading, Pa.
Zapon-Brevolite Division, Atlas Powder Co., North Chicago,
Ill.

#### PAINT, HOT SURFACES

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland, O.
Allen Co., L. B., Chicago.
American Chemical Paint Co., Ambler, Pa.
Baer Brothers, New York City.
Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co. Philadelphia, Pa.
Carey Co., Philip, Lockland, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Continental Products Co., Euclid, Ohio.
Debevoise Co., Brooklyn, N. Y.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Gerard Chemical Co., Elizabeth, N. J.

Glidden Co., Cleveland, O.

Hague & Co., Inc., Alfred, Brooklyn, N. Y.

Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.

Hetzel Roofing Products Co., Newark, N. J.

Hilo Varnish Corp., Brooklyn, N. Y.

Horn Co., A. C., Long Island City, N. Y.

Iowa Paint Mfg. Co., Des Moines, Ia.

Krehbiel Co., J. H., Chicago.

Laclede-Christy Clay Products Co., St. Louis, Mo.

Lastik Products Co., Inc., Pittsburgh, Pa.

Metropolitan Refining Co., Long Island City, N. Y.

National Mfg. Corp., Tonawanda, N. Y.

Nebel Manufacturing Co., Cleveland.

O'Brien Varnish Co., South Bend, Ind.

Ohmlac Paint & Refining Co., Chicago, Ill.

Pyrolite Products Co., Cleveland, O.

Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

Sauereisen Cements Co., Sharpsburg, Pa.

Sherwin-Williams Co., Cleveland.

Technical Coatings, Inc., Frooklyn, N. Y.

Thompson & Co., Pittsburgh, Pa.

Tropical Paint & Oil Co., Cleveland, O.

Truscon Laboratories, Detroit, Mich.

Wailes Dove-Hermiston Corp., Westfield, N. J.

Westinghouse Electric & Manufacturing Co., East Pittsburgh.

Wilhelm Co., A., Reading Pa. burgh. Wilhelm Co., A., Reading Pa.

#### PAINT, ROOFING

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland, O.
Asphalt Products Co., Syracuse, N. Y.
Baer Brothers, New York City.
Barber Asphalt Corp., Barber, N. J.
Barber Co., Inc., Philadelphia, Pa. (Asphalt)
Barrett Co., New York City. (Pitch)
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Lockland, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Certain-teed Products Corp., New York City.
Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian) Certain-teed Products Corp., New York City.
Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian)
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, Ohio. (All kinds)
Debevoise Co., Brooklyn, N. Y.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Flintkote Co., New York City.
Ford Roofing Products Company, Chicago.
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg. Co., Des Moines, Ia (Asphalt)
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh, Pa. (Bituminous)
Kreblel Co., J. H., Chicago.
Lastik Products Co., Inc., Pittsburgh, Pa. (Asphalt, Tar)
Lehon Co., Chicago.
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Nebel Manufacturing Co., Cleveland.
Ohmlac Paint & Refining Co., Chicago, Ill. (Asphalt)
Pecora Paint Co., Philadelphia, Pa.
Pyrolite Products Co., Cleveland, O.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh,
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt. (Asphalt)
Sherwin-Williams Co., Cleveland.
Thompson & Co., Pittsburgh, Pa.
Tamms Silica Co., Chicago, Ill.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit.
Wailes Dove-Hermiston Corp., Westfield, N. J.
Wilhelm Co., A., Reading Pa.

#### PAINT SPRAY GUNS

See Guns, Spray, Paint

## PAPER, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago.
Barber Asphalt Corp., Barber, N. J.
Carey Co., Philip, Lockland, Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Grant Wilson, Inc., Chicago.
Johns-Manville New York City.
Keasbey & Mattison Co., Ambler, Pa.
Linear Packing & Rubber Co., Inc., Philadelphia.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ruberoid Co., New York City.

Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Wilson, Inc., Grant, Chicago, Ill.

## PARTS, for HEATING and AIR CONDITIONING EQUIPMENT

(Tank Heads and Bottoms, Water Heater Legs)

•Commercial Shearing & Stamping Co., Youngstown, O.

## PASTE, ASBESTOS PAPER

Acme Asbestos Covering & Flooring Co., Chicago. Clark Stek-O Corp., Rochester, N. Y.

Grant Wilson, Inc., Chicago.
Keasbey & Mattison Co., Ambler, Pa.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt.

Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Western Mineral Products Co., Omaha, Nebr.

Wilson, Inc., Grant, Chicago, Ill.

#### PATTERNS, BLUE PRINT, ELBOWS, SKYLIGHTS and FITTINGS

Gray, G. L., New Haven, Conn.

#### PERFORATED METAL See Metals, Perforated, Sheet and Plate

PILLOW BLOCKS See Bearings, Pillow Block

#### PIPE, CONDUCTOR

PIPE, CONDUCTOR

Ames Co., W. R., San Francisco, Cal.
Barnes Metal Products Co., Chicago, Ill.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.

Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
Edwards Manufacturing Co., Inc., Cincinnati.
Herbert & Sons, T. L., Nashville, Tenn.

Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.

Meyer & Bro. Co., F., Peoria, Ill.

Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., Dver, O.
Revere Steel & Mfg. Co., Dover, O.
Revere Copper and Brass Incorporated, New York City.
Schoedinger Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Sar Francisco.
Woolwine Metal Products Co., Los Angeles, Cal.
York Corrugating Co., York, Pa.

#### PIPE, FURNACE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Biersach & Niedermeyer Co., Milwaukee.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis.
Chicago Furnace Supply Co., Chicago, Ill.
Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.

Advertisement in this issue. See Index to Advertisers, page 304

111.

Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Gray Metal Products, Inc., Rochester, N. Y.
Green Colonial Furnace Co., Des Moines, Ia.
Henry Furnace & Foundry Co., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamneck Products, Inc., Middletown, O.
Lee Furnace Co., South Bend, Ind.
Lennox Furnace Co., Marshalltown, Ia.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Martin Metal Mfg. Co., Wichita, Kan.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Payne Furnace & Supply Co., Beverly Hills, Cal.
Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schecter Brothers Co., Philadelphia, Pa.
Schoedinger Co., F. O., Columbus, O.
Skinner Htg. & Vent. Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.
United States Register Co., Battle Creek, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Williamson Heater Co., Cincinnati, O.
Williams-Wallace Co., San Francisco.

## PIPE, SMOKE

PIPE, SMOKE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airtherm Mfg. Co., St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Campbell Heating Co., Des Moines, Ia.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.
Chicago Metal Mfg. Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Galva Heater Co., Galva, Ill. (Cast Iron)
Green Colonial Furnace Co., Des Moines, Ia.
Henry Furnace & Foundry Co., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Bes Moines, Ia.
La Crosse Steel Roofing & Corrurating Co., La Crosse, Wis.
Lamneck Products, Inc., Middletown, O.
Lee Furnace Co., South Bend, Ind.
Lyon, Conkiin & Co., Inc., Baltimore, Md.
Majestic Co., Huntington, Ind.
Maple City Furnace Co., Marshall, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
Meyer & Bro. Co., F., Peoria, Ill.
Milleor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Patten Co., J. V., Sycamore, Ill.
Peerless Foundry Co., Indianapolis, Ind.
Ortland Stove Foundry Co., Portland, Me.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schecter Brothers Co., Philadelphia, Pa.
Schoedinger Co., F. O., Columbus, O.
Standard Furnace & Supply Co., Omaha, Nebr.
Ster-Na-Man Foundry Co., Springfield, Ill. (Cast Iron)
Straton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.
United States Register Co.,

Williamson Heater Co., Cincinnati, O. Williams-Wallace Co., San Francisco.
 Wise Furnace Co., Akron, O.

## PIPE & FITTINGS, GAS VENT AND FLUE

Char-Gale Mfg. Co., Minneapolis. (blue and galvanized)

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Condensation Engineering Corp., Chicago.
Johns-Manville, New York City.

Osborn Co., J. M. & L. A., Cleveland.

Payne Furnace & Supply Co., Beverly Hills, Cal. (Insulated Aluminum)

Wilder Manufecturing Co., Niles O.

Wilder Manufacturing Co., Niles, O. Williams-Wallace Co., San Francisco.

#### PIPE AND FITTINGS, SHEET METAL See Ducts and Fittings, Prefabricated

#### PITTSBURGH LOCK FORMING MACHINES See Machines, Pittsburgh Lock Forming

# PLATE, BEARING, STUDDING SPACE Adjustable Bearing Plate Co., St. Louis, Mo.

## PLATES, ALLOY

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Company of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn. (Copper)
American Rolling Mill Co., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Carnegie-Illinois Steel Corp., Pittsburgh.
Colonial Alloys Co., Philadelphia.
Crucible Steel Co. of America, New York City.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Republic Steel Corp., Cleveland, O.
Revere Copper and Brass Incorporated, New York City.
Universal-Cyclops Steel Corporation, Bridgeville, Pa.

Youngstown Sheet & Tube Co., Youngstown, O.

## PLATES, STEEL

PLATES, STEEL

American Rolling Mill Co., Middletown, O.
Berger Mfg. Div. Republic Steel Co., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Otis Steel Co., Cleveland, O.
Republic Steel Corp., Cleveland.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.
Voungstown Sheet & Tube Co., Youngstown, O.

#### PLATES, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

#### PREFABRICATED DUCTS See Ducts and Fittings, Prefabricated

#### PRESSES AND DIES

Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
•Dreis & Krump Mfg. Co., Chicago, Ill.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Henry & Wright Mfg. Co., Hartford, Conn.
Leslie Welding Co., Chicago. (Hand Punch Press)
•Marshalltown Mfg. Co., Marshalltown, Ia.
Minster Machine Co., Minster, O.
New Albany Machine Mfg. Co., New Albany, Ind.
•Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

Perkins Machine Co., Warren, Mass. Schatz Mfg. Co., Poughkeepsie, N. Y. Service Machine Co., Elizabeth, N. J. Spun Steel Corp., Canton, O. Swain Mfg. Co., Fred J., St. Louis.

• Verson Allsteel Press Co., Chicago. Zeh & Hahnemann Co., Newark, N. J.

PROTECTORS, DOWNSPOUT See Fittings and Accessories, Conductor

## PSYCHROMETERS, SLING AND HAND-ASPIRATED

American Moistening Co., Providence, R. I.
Friez & Sons, Julien P., Baltimore.
G. M. Manufacturing Co., New York City.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hill Co., Chicago, Ill.
Johnson Service Co., Milwaukee.
Moeller Instrument Co., Brooklyn, N. Y.
Palmer Co., Norwood, Cincinnati, O.
Parks-Cramer Co, Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit.
Taylor Instrument Companies, Rochester, N. Y.
Weksler Thermometer Corp., New York City. Weksler Thermometer Corp., New York City.

PULLEYS, FAN AND MOTOR Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
•Central Die Casting & Mfg. Co., Inc., Chicago.
Chicago Die Casting Co., Chicago, Ill.
Congress Die Casting Div., Congress Tool & Die Co., Detroit, Mich. Congress Die Casting Div., Congress Tool & troit, Mich.
Dayton Rubber Mfg. Co., Dayton, Ohio.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Duro Metal Products Co., Chicago, Ill.
Gates Rubber Co., Denver, Colo.
Goldens' Fdry. & Mach. Co., Columbus, Ga.
Horton Mfg. Co., Minneapolis, Minn.
Jones Fdry. & Mach. Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Linderme Machine & Tool Co., Inc., Detroit.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Moloch Fdry. & Mach. Co., Kaukauna, Wis.
Morrison Products, Inc., Cleveland.
Pyott Fdry. & Mach. Co., Chicago, Ill.
Reynolds Mfg. Co., Grand Rapids, Mich.
Rockwood Mfg. Co., Indianapolis, Ind.
St. Louis Tool Co., St. Louis.
Smith, Inc., Winfield, H., Springfield, N. Y.
Spun Steel Corp., Canton, O.
Swift Mfg. Co., Datroit, Mich.

Ottility Fan Corporation, Los Angeles, Cal.
Wood's Sons Co., T. B., Chambersburg, Pa.

### PULLEYS, FURNACE CHAIN

Hart & Cooley Mfg. Co., Holland, Mich. Medart Co., St. Louis.
Mueller Furnace Co., L. J., Milwaukee, Wis. Stover Mfg. & Engine Co., Freeport, Ill.
United States Register Co., Battle Creek, Mich.

#### PULLEYS, VARIABLE SPEED

Allis-Chalmers Manufacturing Co., Milwaukee.
American Pulley Co., Philadelphia.
Briggs & Stratton, Milwaukee.
Browning Mfg. Co., Inc., Maysville, Ky.
Columbia Vari-Speed Co., Wheaton, Ill.
Dodge Manufacturing Corp., Mishawaka, Ind.
Jeffrey Mfg. Co., Columbus, O.
Lewellen Mfg. Co., Columbus, Ind.
Link-Belt Co., Chicago.
Moore Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Reeves Pulley Co., Columbus, Ind.
Speedmaster Co., Des Plaines, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

White Manufacturing Co., St. Paul. Allis-Chalmers Manufacturing Co., Milwaukee.

#### PUMPS, DEEP-WELL

American-Marsh Pumps, Inc., Battle Creek, Mich.
Chandler Co., Cedar Rapids, Ia.
Cook, Inc., A. D., Lawrenceburg, Ind.
Crane Co., Chicago, Ill.

Dayton Pump & Mfg. Co., Dayton, O.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Deming Co., Salem, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Heil Co., Milwaukee, Wis.
Layne & Bowler, Inc., Memphis, Tenn.
Meler Electric & Machine Co., Indianapolis, Ind.
Micro-Westco, Inc., Bettendorf, Ia.
Myers & Bro. Co., F. E., Ashland, O.
Peerless Pump Div., Food Machinery Co., Canton, O.
Pomona Pump Co., Pomona, Cal.
Red Jacket Mfg. Co., Davenport, Ia.
Roper Corp., Geo. D., Rockford, Ill.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Victor Equipment Co., Los Angeles, Cal.

## PUMPS, SHALLOW-WELL

American-Marsh Pumps, Inc., Battle Creek, Mich.

Chandler Co., Cedar Rapids, Ia.
Chicago Pump Co., Chicago.
Cook, Inc., A. D., Lawrenceburg, Ind.
Crane Co., Chicago, Ill.
Dayton Pump & Mfg. Co., Dayton, O.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Div., General Motors Sales Corp., Rochester,
N. Y.
Deming Co. Salem O. N. Y.

Deming Co., Salem, O.

Everite Pump & Mfg. Co., Inc., Lancaster, Pa.

Fairbanks, Morse & Co., Chicago, Ill.

Goulds Pumps, Inc., Seneca Falls, N. Y.

Hell Co., Milwaukee, Wis.

Layne & Bowler, Inc., Memphis, Tenn.

Lewis & Co., Inc., Chas. S., St. Louis.

Meler Electric & Machine Co., Indianapolis, Ind.

Micro-Westco, Inc., Bettendorf, Ia.

Morris Machine Works, Baldwinsville, N. Y.

Myers & Bro. Co., F. E., Ashland, Ohio.

Pomona Pump Co., Pomona, Cal.

Red Jacket Mfg. Co., Davenport, Ia.

Roper Corp., Geo. D., Rockford, Ill.

Sterling Pump Corporation, Hamilton, O.

Uniflow Mfg. Co., Erle, Pa.

Union Steam Pump Co., Battle Creek, Mich.

United Motors Service, Detroit, Mich.

Victor Equipment Co., Los Angeles, Cal.

Viking Pump Co., Cedar Falls, Ia.

## PUMPS, WATER CIRCULATING

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
De Laval Steam Turbine Co., Trenton, N. J.
Economy Pumps, Inc., Chicago.
Essick Mfg. Co., Los Angeles. (for Evaporative Coolers)
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.

Frederick Iron & Steel Co., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand, New York City.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Micro-Westco, Inc., Chas. S., St. Louis, Mo.
Micro-Westco, Inc., Chas. S., St. Louis, Mo.
Nachine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Palmer Electric Co., Detroit, Mich.
Pernot & Rich, Inc., Los Angeles.
Quimby Pump Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, Ohio.
Roper Corp., Geo. D., Rockford, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sterling Pump Corporation, Hamilton, O.
Swaby Mfg. Co., Chicago, Ill.
Trane Co., LaCrosse, Wis.
Trimount Rotary Power Co., East Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Calear Falls, Ia.

Weil Pump Co., Chicago, Ill.
Weinman Pump Co., Columbus, O.
Yeomans Bros. Co., Chicago, Ill.
Weinman Pump Co., Columbus, O.
Yeomans Bros. Co., Chicago, Ill.

#### PUNCHES AND SHEARS COMBINED, LEVER OPERATED

Armstrong-Blum Mfg. Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bollaert, M., Oakland, Cal.
Buffalo Forge Co., Buffalo, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G.D.S. Machinery & Supply Co., New York City.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.

\*Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
National Machine Tool Co., Racine, Wis.

\*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Div. of Hannifin Mfg. Co., Chicago.
Royersford Foundry & Machine Co., Royersford, Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

\*Weiss & Co., H., New York City.

## PUNCHES, BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bollaert, M., Oakland, Cal.
Buffalo Forge Co., Buffalo, N. Y.
Champlon Blower & Forge Co., Lancaster, Pa.
Clough, A. W., Meriden, Conn.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.

Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.

Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Rock River Machine Div. of Hannifin Mfg. Co., Chicago.
Schatz Mfg. Co., Poughkeepsie, N. Y.

Verson Allsteel Press Co., Chicago.

Weiss & Co., H., New York City.

Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Philadelphia.

#### PUNCHES, COMBINATION HAND AND BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bollaert, M., Oakland, Cal.
Champion Blower & Forge Co., Lancaster, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Niagara Machine & Tool Works, Buffalo, N. Y.
Parker-Kalon Corp., New York City.
Peck, Stow & Wilcox Co., Southington, Conn.
Rock River Machine Div. of Hannifin Mfg. Co., Chicago.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Weiss & Co., H., New York City.
Whitney Mfg. Co., W. A., Rockford, Ill.

#### PUNCHES, HAND

PUNCHES, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bertsch & Co., Cambridge City, Ind.
Bollaert M., Oakland, Cal.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Clough, A. W., Meriden, Conn.

Crescent Tool Co., Jamestown, N. Y.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Johnson, Inc., William, Newark, N. J.

Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Maplewood Machinery Co., Inc., Chicago.

Niagara Machine & Tool Works, Buffalo, N. Y.

Parker-Kalon Corp., New York City.
Peck Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry. New York City.
Rock River Machine Div. of Hannifin Mfg. Co., Chicago.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Stanley Tools, New Britain, Conn.

Weiss & Co., H., New York City.

Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Mfg. Co., Rockford, Ill.
Whitney Metal Tool Co., Philadelphia.

#### PUNCHES, POWER

Beatty Machine & Mfg. Co., Hammond, Ind. Bertsch & Co., Cambridge City, Ind. Bliss Co., E. W., Toledo, O. Buffalo Forge Co., Buffalo, N. Y.

Callahan Can Machine Co., Inc., Brooklyn, N. Y. Cleveland Punch & Shear Works Co., Cleveland, O. Excelsior Tool and Machine Co., East St. Louis, Ill. Heartley Machine & Tool Co., Toledo, O. Hendley & Whittemore Co., Beloit, Wis. Henry & Wright Mfg. Co., Hartford, Conn. New Albany Machine Mfg. Co., New Albany, Ind.

Niagara Machine & Tool Works, Buffalo, N. Y. Peck, Stow & Wilcox Co., Southington, Conn. Pels & Co., Inc., Henry, New York City. Perkins Machine Co., Warren, Mass.

Rock River Machine Div. of Hannifin Mfg. Co., Chicago. Royersford Foundry & Machine Co., Royersford, Pa. Schatz Mfg. Co., Poughkeepsie, N. Y. Service Machine Co., Elizabeth, N. J. Swaine Mfg. Co., Fred J., St. Louis, Mo.

Verson Allsteel Press Co., Chicago.

Weiss & Co., H., New York City.

Whitney Metal Tool Co., Rockford, Ill. Wiedemann Machine Co., Philadelphia. Zeh & Hahnemann Co., Newark, N. J.

#### QUADRANTS, DAMPER See Regulators, Damper Sets

#### RECORDERS, HUMIDITY, PORTABLE

Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Reg.
Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
Marsh Corporation, Jas. P., Chicago.

◆Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Scientific Instrument Co., Detroit.
Taylor Instrument Companies, Rochester, N. Y.

## RECORDERS, TEMPERATURE, PORTABLE

Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Reg.
Co., Philadelphia, Pa.
Defender Automatic Regulator Co., St. Louis.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
Marsh Corporation, Jas. P., Chicago.
Mason-Neilan Regulator Co., Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, New York City.
Practical Instrument Co., Chicago, Ill.
Scientific Instrument Co., Detroit.
Taylor Instrument Companies, Rochester, N. Y. Taylor Instrument Companies, Rochester, N. Y.

#### REFRACTORIES

REFRACTORIES

Babcock & Wilcox Co., New York City.
Chapman Clay Co., Zanesville, O.
Chicago Fire Brick Co., Chicago, Ill.
Fireline Stove & Furnace Lining Co., Chicago.
General Insulating Products Co., Brooklyn.
Gilbert & Son, Harry E., Bridzeport, Conn. (Radiant)
Green Fire Brick Co., A. P., Mexico, Mo.
Johns-Manville, New York City. (Cement and monolithic)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo. (Fire brick
and high temperature mortars)
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Pilbrico Jointless Firebrick Co., Chicago. (Plastic fire brick
for stokers and oil burners)
Preferred Utilities Mfg. Corp., New York City.
Pyrolite Products Co., Cleveland, O.
Refractory & Insulation Corp., New York City.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Ruberoid Co., New York City.
Schundler & Co., Inc., F. E., Joliet, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Universal Zonolite Insulation Co., Chicago. (Brick and
Concrete)
Walsh Refractories Corp., St. Louis, Mo. Walsh Refractories Corp., St. Louis, Mo.

#### REGISTER SHIELDS See Shields, Warm Air Register

## REFRIGERATING UNITS

See Compressors, Refrigerating

#### REGISTERS, DIRECTIONAL FLOW

Adelta Manufacturing Co., Philadelphia.

• Air Control Products, Inc., Muskegon, Mich.

Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Char-Gale Mfg. Co., Minneapolis.
Diamond Manufacturing Co., Wyoming, Pa.
Elsey Metal Specialties Co., Detroit, Mich.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gillian Mfg. Co., Detroit.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mig. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Kauffman Air Conditioning Corp., St. Louis.
Middleton Mfg. & Sales Co., Minneapolis.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Standard Stamping & Perforating Co., Chicago.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.

#### REGISTERS, HEATING AND VENTILATING

g.

n.

nn.

rick

rick

and

1941

REGISTERS, HEATING AND VENTILATING

Acme Tin Plate & Roofing Supply Co., Philadelphia.
Adelta Manufacturing Co., Philadelphia.

Air Control Products, Inc., Muskegon, Mich.

American Foundry & Furnace Co., Bloomington, Ill.

Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.

Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Gillian Mfg. Co., Detroit.

Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.

Independent Register Co., Cleveland, O.
Kaufman Air Conditioning Corp., St. Louis.

Lamneck Products, Inc., Middletown, O.
Middleton Mfg. & Sales Co., Minneapolis.

Mueller Furnace Co., L. J., Milwaukee, Wis.
Newman Brothers, Inc., Cincinnati, O.

Pacific Gas Radiator Co., Huntington Park, Cal.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Roberts-Hamilton Co., Minneapolis, Minn.

Rock Island Register Co., Rock Island, Ill.

Standard Stamping & Perforating Co., Chicago.

Tuttle & Bailey, Inc., New Britain, Conn.

United States Register Co., Battle Creek, Mich.

Waterloo Register Co., Waterloo, Ia.

## REGULATORS, DAMPER SETS

Adams Company, The, Dubuque, Ia.
 Air Control Products, Inc., Muskegon, Mich.
 California Cornice, Steel and Supply Corp., Los Angeles.

Cal.

Gerett Co., M. A., Milwaukee.
Goese Mfg. Co., Milwaukee, Wis.

Hart & Cooley Mfg. Co., Holland, Mich.
Joal Mfg. Corp., Toledo.
Kerentoff, G. L., Cincinnati.
Ohio Products Co., Cleveland.

Parker-Kalon Corp., New York City.

Tuttle & Bailey, Inc., New Britain, Conn.

United States Register Company, Battle Creek, Mich.
Young Regulator Co., Cleveland.

#### REGULATORS, DRAFT, SMOKE PIPE

Atlas Valve Company, Newark, N. J.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.

Cole-Sullivan Engineering Co., Minneapolis, Minn.

Conco Engineering Works, Mendota, Ill.
Defender Automatic Regulator Co., St. Louis.
Field Mfg. Co., Chicago, Ill.
Glibert & Barker Mfg. Co., Springfield, Mass.
Gold Seal Furnace Co., Minneapolis, Minn. (Automatic)
Harvey-Whipple, Inc., Springfield, Mass.
Hotstream Heater Co., Cleveland, O. (Automatic)
James Regulator Co., Inc., Pottsville, Pa.
Platt Products Corp., Lansing, Mich.
Polk Mfg. Co., Madison, Wis.
Preferred Utilities Mfg. Corp., New York City.

Simplex Mfg. Co., Fond du Lac, Wis.

Walker Mfg. & Sales Corp., St. Joseph, Mo.
Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

#### REGULATORS, FURNACE DRAFT, MECHANICAL

Au-Temp Co Corp., New York City.
Barber-Colman Co., Rockford, Ill.
Defender Automatic Regulator Co., St. Louis.
Fulton Sylphon Co., Knoxville, Tenn.
Gleason-Avery, Inc., Auburn, N. Y.
Gold Seal Furnace Co., Minneapolis, Minn.

Hart & Cooley Mfg. Co., Holland, Mich.
Hays Corp., Michigan City, Ind.
Little Janitor Furnace Clock Co., New York City.

Mercoid Corp., Chicago, Ill.

Minneapolis Automatic Draft Regulator Co., Minneapolis,

Minneapolis Automatic Draft Regulator Co., Minneapolis, Minn.

•Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Tem Products Co., Midland, Pa.
Timm & Son, P. C., Lincoln, Nebr.
Uni-Therm Products Co., Elyria, O.
Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

#### RELAYS, ELECTRICAL

RELAYS, ELECTRICAL

Advance Electric Co., Los Angeles, Cal.
Allen-Bradley Co., Milwaukee, Wis.
American Instrument Co., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Au-Temp-Co Corp., New York City.

• Automatic Products Co., Milwaukee.
Automatic Switch Co., New York City.
Automatic Temperature Control Co., Inc., Philadelphia.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Chicago.
Bender Warrick Corp., Birmingham, Mich.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cook Electric Co., Chicago, Ill.
Cramer Company, Inc., R. W., Centerbrook, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.

Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia, Pa.
Durakool, Inc, Elkhart, Ind. (Mercury)
Edison, Inc., Thomas A., Instrument Div., West Orange,
N. J.
Electric Controller & Mfg. Co., Cleveland, O.
Friez & Sons Julian P. Politicana Mich.

N. J.

Electric Controller & Mfg. Co., Cleveland, O.
Friez & Sons, Julien P., Baltimore, Md.

General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
McCorkle Co., D. H., Berkeley, Cal.
Magnet Switch Co., Chicago.

Mercoid Corp., Chicago, Ill.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., Baltimore, Md.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Russell Electric Company, Chicago.

Precision Thermometer & Instrument Co., Philadelphia, P. Russell Electric Company, Chicago.

Spencer Thermostat Co., Attleboro, Mass.

Square D Co., Detroit.

Taylor Instrument Companies, Rochester, N. Y.

Triplex Mfg. Co., Peru, Ind.

Ward Leonard Electric Co., Mt. Vernon, N. Y.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Weston Electrical Instrument Corp., Newark, N. J.

White Manufacturing Co., St. Paul.

White-Rodgers Electric Co., St. Louis.

Zenith Electric Co., Chicago, Ill.

#### REPAIRS, STOVE AND FURNACE

REPAIRS, STOVE AND FURNACE

Adams Company, The, Dubuque, Ia.
Associated Heater Parts Co., Chicago, Ill.
Banner Repair Parts Co., Youngstown, O.
Brauer Supply Co., A. G., St. Louis, Mo.
Capitol Furnace & Stove Repair Co., Indianapolis, Ind.
Central Furnace & Stove Repair Co., St. Louis, Mo.
Cincinnati Stamping Co., Cincinnati, O.
Cilark Co., Henry N., Boston.
Des Moines Stove Repair Co., Des Moines, Ia.
Edwards Furnace Co., Wellsboro, Pa.
Eselgroth & Co., Newark, N. J.
Faultless Heater Corp., Cleveland, O.
Homer Furnace & Foundry Corp., Coldwater, Mich.
Livingston Repair, Marshall, Mich.
Metzner Stove Repair Co., Kansas City, Mo.
Miller & Son, C. Arthur, Elmira, N. Y. (Furnace)
National Foundry & Furnace Co., Dayton, O.
Northwestern Stove Repair Co., Chicago, Ill.
Omaha Stove Repair Works, Omaha, Neb.
Peerless Foundry Co., Indianapolis, Ind.
Peninsular Stove Co., Detroit, Mich.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Portland Stove Foundry Co., Portland, Me.
Shamblen Furnace & Foundry Co., Louisville, Ky.
Wayne Pattern & Foundry Co., Fort Wayne, Ind.

## RETINNING EQUIPMENT and MATERIALS

Retinning Manufacturing Co., Chicago,

#### RIDGE ROLLS AND RIDGING (METAL)

American Rolling Mill Co., Middletown, O.
 Ames Co., W. R., San Francisco, Cal.
 Barnes Metal Products Co., Chicago, Ill.

Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.

Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.

Bethlehem Steel Co., Bethlehem, Pa.
Biersach & Niedermeyer Co., Milwaukee.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Gulf States Steel Co., Birmingham, Ala.

Hussey & Co., C. G., Pittsburgh, Pa. (Copper)

Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee, Wis.
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.

Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.

Republic Steel Corp., Cleveland, O.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Southern States Iron Roofing Co., Savannah, Ga.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.

Williams-Wallace Co., San Francisco, Cal.
Woolwine Metal Products Co., Los Angeles, Cal.

\*Youngstown Sheet & Tube Co., Youngstown, O.

## RIVETS, ALLOY

Allegheny Ludium Steel Corp., Brackenridge, Pa. Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. Bethlehem Steel Co., Bethlehem, Pa. Clark Bros. Bolt Co., Milidale, Conn. National Screw & Mfg. Co., Cleveland.

Republic Steel Corp., Cleveland, O. Townsend Co., New Brighton, Pa. Tubular Rivet & Stud Co., Wollaston, Mass.

#### RIVETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bridgeport Screw Co., Bridgeport, Conn.
Chicago Rivet & Machine Co., Cicero, Ill.
Continental Screw Co., New Bedford, Mass.
Hassall, Inc., John, Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.
Tubular Rivet & Stud Co., Wollaston, Mass.

#### RIVETS, BRASS, COPPER AND IRON

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.

Bethlehem Steel Co., Bethlehem, Pa. (Iron)
Blake & Johnson Co., Waterville, Conn.
Bridgeport Screw Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Rivet & Machine Co., Cicero, Ill.
Continental Screw Co., New Bedford, Mass.
Downs-Smith Brass & Copper Co., New York City.
Hassall, Inc., John, Brooklyn, N. Y.

Hussey & Co., C. G., Pittsburgh, Pa.
National Screw & Mfg. Co., Cleveland, O.
Townsend Co., New Brighton, Pa.
Tubular Rivet & Stud Co., Wollaston, Mass.

## RIVETS, STEEL

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. Atlas Bolt & Screw Co., Cleveland, O.

Bethlehem Steel Co., Bethlehem, Pa. Chicago Rivet & Machine Co., Cicero, Ill. Clark Bros. Bolt Co., Milldale, Conn. Inland Steel Co., Chicago, Ill. National Screw & Mfg. Co., Cleveland.

Republic Steel Corporation, Cleveland.
Townsend Co., New Brighton, Pa.
Tubular Rivet & Stud Co., Wollaston, Mass.

#### ROD, GAS WELDING

Air Reduction Sales Co., New York City.
American Agile Corporation, Cleveland.

American Brass Co., Waterbury, Conn.
American Steel & Wire Co., Chicago, Ill.
Bastian Blessing Co., Chicago.
Bridgeport Brass Co., Bridgeport, Conn.

Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.

Chicago Steel & Wire Co., Chicago.
Crucible Steel Co. of America, New York City.
Duraloy Co., Scottdale, Pa.
Handy & Harmon, New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
International Nickel Co., Inc., New York City. (Monel)
Linde Air Products Co., The, New York City.
Maurath, Inc., Cleveland, O.
Milburn Co., Alexander, Baltimore, Md.
Modern Engineering Co., St. Louis.
Page Steel & Wire Div., Monessen, Pa. (Stainless Steel)
Republic Steel Corporation, Cleveland.
Revere Copper and Brass Incorporated, New York City.
Roebling's Sons Co., John A., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio.
Torchweld Equipment Div., National Cylinder Gas Co.,
Chicago, Ill.
Universal Power Corporation, Cleveland.
Walworth Co., New York City.
Wickwire Spencer Steel Co., New York City.

•Youngstown Sheet & Tube Co., Youngstown, O.

## ROOFING, ALUMINUM

Air-O-Cel Industries, Inc., Detroit, Certain-teed Products Corporation, New York City, Fingles Co., The, Baltimore, Md.

#### ROOFING, BUILT-UP

Air-O-Cel Industries, Inc., Detroit.

American Brass Co., Waterbury, Conn. (Thin copper)
Barber Asphalt Corp., Barber, N. J.
Barber Co., Inc., Philadelphia, Pa.
Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Certain-teed Products Corp., New York City.
Detroit Steel Products Co., Detroit.
Flintkote Co., New York City.
Ford Roofing Products Co., Chicago.
Johns-Manville, New York City.
Koppers Co., Pittsburgh. (Pitch and Felt)
Lehon Company, Chicago.
Logan-Long Co., Chicago, Ill.
National Mfg. Corp., Towananda, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh, Pa.
Ruberoid Co., New York City.
United States Gypsum Co., Chicago, Ill.

## ROOFING, COPPER

eAmerican Brass Co., Waterbury, Conn.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Copper Roofs Corp., Milwaukee.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Fingles Co., The, Baltimore, Md.
Hussey & Co., C. G., Pittsburgh, Pa.

Klauer Manufacturing Co., Dubuque, Ia.
Milcor Steel Co., Milwaukee, Wis.
National Brass & Copper Co., Inc., Lisbon, O.
New Haven Copper Co., Seymour, Conn.
Perkinson & Brown, Chicago.
Revere Copper and Brass Incorporated, New York City.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.

## ROOFING, IRON

•American Rolling Mill Co., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Byers Co., A. M., Pittsburgh, Pa. (Wrought Iron)
•Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
International Steel Company, Evansville, Ind.
Martin Metal Mfg. Co., Wichita, Kan.
Newport Rolling Mill Co., Newport, Ky.
•Republic Steel Corp., Cleveland, O.
Southern States Iron Roofing Co., Savannah, Ga.
•Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, O.

#### ROOFING, LEAD

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Andrews Lead Co., Inc., Long Island City.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Eagle-Picher Lead Co., Cincinnati, Ohio.
Fingles Co., The, Baltimore, Md.

266

Flemm Lead Co., Inc., Long Island City. National Lead Co., New York City. Rochester Lead Works, Rochester, N. Y. Standard Rolling Mills, Inc., Brooklyn, N. Y.

#### ROOFING, SLATE

Chapman Slate Co., Bethlehem, Pa.
Flemm Lead Company, Inc., Long Island City, N. Y.
Jackson-Bangor Slate Co., Pen Argyl, Pa.
North Bangor Slate Co., Bangor, Pa.
Perkinson & Brown, Chicago.
Rising & Nelson Slate Co., West Pawlet, Vt.
Sheldon Slate Products Co., Inc., Granville, N. Y.
Structural Slate Co., Pen Argyl, Pa.
Vendor Slate Co., Inc., Nazareth, Pa.
Vermont Structural Slate Co., Fair Haven, Vt.

#### ROOFING, STEEL

Allegheny Ludium Steel Corp., Brackenridge, Pa. (Stainless)

• American Rolling Mill Co., Middletown, Ohio.

Apollo Steel Company, Apollo, Pa.

Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.

Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.

• Bethlehem Steel Co., Bethlehem, Pa.

Budke Stamping Co., Canonsburg, Pa.

• Carnegie-Illinois Steel Corp., Pittsburgh.

• Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

• Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.

Continental Steel Corp., Kokomo, Ind.

Detroit Steel Products Co., Detroit.

Edwards Manufacturing Co., Inc., Cincinnati.

Inland Steel Co., Chicago.

Detroit Steel Products Co., Detroit.
Edwards Manufacturing Co., Inc., Cincinnati.
Inland Steel Co., Chicago.
International Steel Company, Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.

Klauer Manufacturing Co., Dubuque, Ia.
Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee.
Newport Rolling Mill Co., Newport, Ky.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Perkinson & Brown, Chicago.
Porcelain Steels, Inc., Cleveland. (Porcelain Enameled)
Reeves Steel & Mfg. Co., Dover, Ohio.

Republic Steel Corp., Cleveland.
Robertson Co., H. H., Pittsburgh.
St. Paul Corrugating Co., St. Paul, Minn.
Southern States Iron Roofing Co., Savannah, Ga.

Superior Sheet Steel Co. Div. Continental Steel Corp., Canton, O.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, Ohio.
Truscon Steel Co., Youngstown, Ohio.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.

## ROOFING, TERNE PLATE

Berger Mfg. Div., Republic Steel Corp., Canton, Ohio.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Pittsburgh.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, Ohio.

Edwards Mfg. Co., Inc., Cincinnati.

Follanshee Steel Corporation, Pittsburgh.

Klauer Manufacturing Co., Dubuque, Ia.

Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee.

Republic Steel Corp., Cleveland.

Southern States Iron Roofing Co., Savannah, Ga.

Tiffin Art Metal Co., Tiffin, Ohio.

Weirton Steel Co., Weirton, W. Va.

Wheeling Corrugating Co., Wheeling, W. Va.

Wheeling Steel Corp., Wheeling, W. Va.

Wheeling Steel Corp., Wheeling, W. Va.

Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROOFING, TILE (CLAY & CONCRETE)

Hood Co., B. Mifflin, Daisy, Tenn. (Clay) Ludowici-Celadon Co., Chicago, Ill. Murray Tile Co., Cloverport, Ky. National Fireproofing Corp., Pittsburgh. Perkinson & Brown, Chicago. Truscon Laboratories, Detroit. United States Gypsum Co., Chicago.

## ROOFING, TIN

Berger Mfg. Div. of Republic Steel Corp., Canton, O.

Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Edwards Mfg. Co., Inc., Cincinnati.
Follansbee Steel Corporation, Pittsburgh, Pa.

Klauer Manufacturing Co., Dubuque, Ia.
Martin Metal Mfg. Co., Wichita, Kan.

Milcor Steel Co., Milwaukee, Wis.
Perkinson & Brown, Chicago.

Republic Steel Corporation, Cleveland.
Southern States Iron Rfg. Co., Savannah, Ga.
Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md. Md.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Wheeling Corrugating Co., Wheeling, W. Va. Wheeling Metal & Mfg. Co., Moundsville, W. Va. Wheeling Steel Corp., Wheeling, W. Va.

## ROOFING, ZINC

American Zinc Products Co., Greencastle, Ind.
Barnes Metal Products Co., Chicago, Ill.
Edwards Mfg. Co., Inc., Cincinnati.
Illinois Zinc Co., Peru, Ill. +
Matthlessen & Heggler Zinc Co., La Salle, Ill.
New Jersey Zinc Co., New York City.
Southern States Iron Rfg. Co., Savannah, Ga.
Wheeling Corrugating Co., Wheeling, W. Va. (Coated) (Coated)

## SAVERS, HEAT

Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y. Barclay, Inc., Robert, Chicago.
Bedard Mfg. Co., Minneapolis, Minn. (Smoke Pipe)
Cary Mfg. Co., Waupaca, Wis.
Chinook, Inc., St. Paul, Minn.
Condensation Engineering Corp., Chicago, Ill.
Crown Fuel Saver Co., Richmond, Ind.
Gerhardt, W. F., Richmond, Va.
Harvey-Whipple, Inc., Springfield, Mass.
Industrial Sheet Metal Works, Inc., Detroit.
Roberts-Hamilton Co., Minneapolis, Minn.
Woolery Machine Co., Minneapolis, Minn.

#### SAWS, BAND, SHEET METAL CUTTING

Atkins & Co., E. C., Indianapolis, Ind.
Barnes, W. O., Detroit.
Continental Machines Incorporated, Minneapolis. (Rotary)
Grob Brothers, Grafton, Wis.
Disston & Sons, Inc., Henry, Tacony Sta., Philadelphia.
Tannewitz Works, Grand Rapids, Mich.
Wells Mfg. Corp., Three Rivers, Mich.

## SAWS, HACK, POWER

Atkins & Co., E. C., Indianapolis, Ind.
Champion Blower & Forge Co., Lancaster, Pa.
Racine Tool & Machine Co., Racine, Wis.
Robertson, F. L., Buffalo.
Royersford Foundry & Machine Co., Royersford, Pa.
Syntron Co., Homer City, Pa. (Electric, semi-portable)

#### SCREENS, SUN REFLECTING

Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

## SCREWS, DRIVE

American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Atlas Bolt & Screw Co., Cleveland.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.

Deniston Co., Chicago, Ill.
Elco Tool & Screw Corporation, Rockford, Ill.
Hassall, Inc., John, Brooklyn, N. Y.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.

Parker-Kalon Corp., New York City. (Hardened Metallic)
Townsena Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

#### SCREWS, SELF-TAPPING

American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Atlas Bolt & Screw Co., Cleveland.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corporation, New Britain, Conn.
Elco Tool & Screw Corporation, Rockford, Ill.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.

Parker-Kalon Corp., New York City.

Advertisement in this issue. See Index to Advertisers, page 304

941

Pheoll Manufacturing Co., Chicago. Shakeproof Lock Washer Co., Chicago, Ill. •United States Register Co., Battle Creek, Mich.

#### SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
(Stainless Steel)
Atlas Bolt & Screw Co., Cleveland.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corporation, New Britain, Conn.
Elco Tool & Screw Corporation, Rockford, Ill.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.

Parker-Kalon Corp., New York City.
Pheoll Manufacturing Co., Chicago.
Shakeproof Lock Washer Co., Chicago.
Townsend Co., New Brighton, Pa.

United States Register Co., Battle Creek, Mich.

#### SHEARS, CIRCLE, HAND

◆Crescent Tool Co., Jamestown, N. Y.
◆Niagara Machine & Tool Works, Buffalo.
◆Quickwork-Whiting Div., Whiting Corp., Harvey, Ill. Peck, Stow & Wilcox Co., Southington, Conn.
◆Wiss & Sons Co., J., Newark, N. J.

SHEARS, HAND AND BENCH See Snips and Shears, Bench and Hand

SHEARS AND PUNCHES COMBINED See Punches and Shears Combined

### SHEARS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md. G. D. S. Machinery & Supply Co., New York City. Independent Presumatic Tool Co., Chicago.

Skilsaw, Inc., Chicago.

Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

Van Dorn Electric Tool Co., Towson, Md.

## SHEARS, ROTARY, SLITTING, HAND

◆Marshalltown Manufacturing Co., Marshalltown, Ia.
 ◆Niagara Machine & Tool Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 ◆Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
 Rafter Machine Co., Belleville, N. J.
 Wagner, C. DeWitt, Cedar Rapids, Iowa.

#### SHEARS, SQUARING, FOOT

Bertsch & Co., Cambridge City, Ind.

Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Royersford Foundry & Machine Co., Royersford, Pa.

#### SHEARS, SQUARING, POWER

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bliss & Co., E. W., Toledo, Ohio.
Cincinnati Shaper Co., Cincinnati, O.
Cieveland Punch & Shear Works Co., Cleveland.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Whitney Metal Tool Company, Rockford, Ill.

#### SHEET METAL PARTS

See Mouldings and Trim; also Stampings, Metal

#### SHEETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa. American Nickeloid Company, Peru, Ill. Fairmont Aluminum Co., Fairmont, W. Va.

## SHEETS, CLAD

Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless) Aluminum Company of America, Pittsburgh. General Plate Co., Div. Metals & Controls Corp., Attleboro,

Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago.

International Nickel Co., Inc., New York City. (Nickel Clad)
Jessop Steel Co., Washington, Pa. (Stainless)
Lukens Steel Co., Coatesville, Pa.
Wheeling Metal & Mfg. Co., Moundsville, W. Va. (Lead)

#### SHEETS. COPPER

●American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., Inc., New York City.
●Hussey & Co., C. G., Pittsburgh, Pa.
National Brass & Copper Co., Inc., Lisbon, O.
New Haven Copper Co., Seymour, Conn.
Revere Copper and Brass Incorporated, New York City.
U. S. Brass & Copper Co., Hyde Park, Mass.

### SHEETS, COPPER, LEAD COATED

●American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ledkote Products Co., Long Island City, N. Y.
National Brass & Copper Co., Inc., Lisbon, O.
New Haven Copper Co., Seymour, Conn.
Revere Copper & Brass Incorporated, New York City.
U. S. Brass & Copper Co., Hyde Park, Mass.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.

#### SHEETS, GALVANNEALED

Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.

Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Newport Rolling Mill Co., Newport, Ky.

Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.

Superior Sheet Steel Co., Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Youngstown Sheet & Tube Co., Youngstown, O.

## SHEETS, LEAD

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Andrews Lead Co., Inc., Long Island City, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Downs-Smith Brass & Copper Co., Inc., New York City.
Eagle-Picher Lead Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York City.
Rochester Lead Works, Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

#### SHEETS, MONEL

•International Nickel Company, Inc., New York City.

## SHEETS, SPECIAL METAL

(Nickel Zinc, Chrome Zinc, Nickel Coated Copper, Chromium Coated Copper, Nickel Coated Steel, Chromium Coated Steel, Chromium Coated Nickel Silver, Zinc Brass, Zinc Copper, etc.)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.

• American Brass Co., Waterbury, Conn. (Copper-Silicon Alloys)

Anerican Nickeloid Co., Peru, Ill.

•Apollo Metal Works, Chicago. (Nickel Alloy, Nickel Zinc,
Chrom Zinc, Nickel Copper, Chrom Copper, Chrom

Steel)

Bethlehem Steel Co., Bethlehem, Pa.

Hussey & Co., C. G., Pittsburgh, Pa.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Lustro Coated Sheets Co., Pittsburgh, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Maysteel Products, Inc., Mayville, Wis.
National Sheet Metal Co., Peru, Ill.

Republic Steel Corporation, Cleveland.
Revere Copper and Brass Incorporated, New York City.
Wilder Manufacturing Company, Niles, O. Steel)

## SHEETS, STAINLESS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.

• American Rolling Mill Co., Middletown, Ohio.

Barium Stainless Steel Corp., Canton, O.

Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Colonial Alloys Co., Philadelphia.
Crucible Steel Co. of America, New York City. (Two-Ply)
Duriron Co., Inc., Dayton, O.
Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Company, Coatesville, Pa.
Republic Steel Corp., Cleveland, O.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
Universal-Cyclops Steel Corp., Bridgeville, Pa.

## SHEETS, STEEL

SHEETS, STEEL

(Polished and Blue, Corrugated and Plain, Black, Terne and Galvanized)

• American Rolling Mill Co., Middletown, O. Apollo Steel Co., Apollo, Pa. Berger Mfg. Div. of Republic Steel Corp., Canton, O.

• Bethlehem Steel Co., Bethlehem, Pa.
• Carnegle-Illinois Steel Corp., Pittsburgh, Pa.
• Columbia Steel Corp., Kokomo, Ind.
Crucible Steel Company of America, New York City.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Steel Corporation, Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md.
National Steel Corp., Pittsburgh, Pa.
Newport Rolling Mill Co., Niles, O.
Oits Steel Co., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Steel & Mfg. Co., Dover, O.
• Republic Steel Corp., Cleveland, Ohio.
Sharon Steel Co., Sharon, Pa.
• Superior Sheet Steel Co., Canton, O. (Galvanized)
• Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.
• Youngstown Sheet & Tube Co., Youngstown, O.

## SHEETS, STEEL, COPPER BEARING

SHEETS, STEEL, COPPER BEARING

American Rolling Mill Co., Middletown, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corporation, Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
National Steel Corp., Pittsburgh.
Newport Rolling Mill Co., Newport, Ky.
Otis Steel Co., Cleveland, O.
Reeves Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Co., Sharon, Pa.
Superior Sheet Steel Co., Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

Y.

111.

941

#### SHEETS, TIN PLATE

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. Berger Mfg. Div. Republic Steel Corp., Canton, O.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco. Crucible Steel Company of America, New York City. Follansbee Steel Corporation, Pittsburgh, Pa.

Granite City Steel Co., Granite City, Ill.

Inland Steel Co., Chicago, Ill.

Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Tinned)

Lyon, Conklin & Co., Inc., Baltimore, Md.

National Steel Corp., Pittsburgh, Pa.

Republic Steel Corporation, Cleveland.

Rochester Lead Works, Inc., Rochester, N. Y.

Sharon Steel Corp., Sharon, Pa.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Weirton Steel Corp., Wheeling, W. Va.

Wheeling Corrugating Co., Wheeling, W. Va.

Youngstown Sheet & Tube Co., Youngstown, O.

#### SHEETS, ZINC

American Nickeloid Co., Peru, Ill.
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Co., New York City.

## SHIELDS, WARM AIR REGISTER

Gammeter Co., W. F., Cadiz, O. (With Humidifier)
Gillian Mfg. Co., Detroit.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Marshallan Mfg. Co., Cleveland.

Patent Novelty Co., Fulton, Iil. (With Humidifier)
Pentecost & Craft Co., Terre Haute, Ind.
Schoedinger, F. O., Co., Columbus, O.
Swing-A-Way Steel Products, Inc., Chicago (with filter).

### SHINGLES AND TILE, METAL

Ames Company, W. R., San Francisco.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O. Columbian Enameling & Stamping Co., Terre Haute, Ind. Edwards Manufacturing Co., Inc., Cincinnati, O. Fingles Co., The, Baltimore, Md.
Globe Iron Roofing & Corrugating Co., Cincinnati, O. Herbert & Sons, T. L., Nashville, Tenn.

Milcor Steel Co., Milwaukee, Wis.

Miller & Doing, Inc., Brooklyn, N. Y.

New Haven Copper Co., Seymour, Conn. (Copper)

Newport Rolling Mill Co., Newport, Ky.

Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo. Reeves Steel & Mfg. Co., Dover, O.

Southern States Iron Roofing Co., Savannah, Ga..

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

(Galv. Steel)

Tiffin Art Metal Co., Tiffin, O.

Wheeling Corrugating Co., Wheeling, W. Va.

Wheeling Metal & Mfg. Co., Moundsville, W. Va.

Wheeling Metal & Mfg. Co., Moundsville, W. Va.

Williams-Wallace Co., San Francisco, Cal. (Painted tin and galv.)

galv.)

#### **SHUTTERS**

See Louvres and Shutters

#### **SKYLIGHTS**

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa. American Sheet Metal Works, New Orleans, La. Anderson Mfg. Co., Des Moines, Ia. Beatrice Steel Tank Mfg. Co., Beatrice, Nebr. Biersach & Niedermeyer Co., Milwaukee, Wis. Brundage Co., Kalamazoo, Mich. California Cornice, Steel and Supply Corp., Los Angeles, Cal. Chicago Metal Mfg. Co., Chicago, Ill.

Cincinnati Sheet Metal & Roofing Co., Cincinnati, O. Edwards Mfg. Co., Inc., Cincinnati, O. Falstrom Co., Passaic, N. J. Fingles Co., The, Baltimore, Md. Goethel Co., Alfred C., Milwaukee, Wis. Herbert & Sons, T. L., Nashville, Tenn. Hirschman Co., Inc., W. F., Buffalo, N. Y. Hudson Equipment Corp., Minneapolis, Minn. International Steel Co., Evansville, Ind.

Klauer Mfg. Co., Dubuque, Ia.
Lee & Son Co., Thomas, Cincinnati, O. Martin Metal Mfg. Co., Wichita, Kan. Mesker & Co., Geo. L., Evansville, Ind. Midwest Ventilating Works, Milwaukee, Wis.

Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo. Northern Furnace & Supply Co., Billings, Mont.

Perkinson & Brown, Chicago.

Riester & Thesmacher Co., Cleveland.
Robertson Co., H. H., Pittsburgh, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont. St. Paul Corrugating Co., St. Paul, Minn. Schoedinger, F. O., Co., Columbus, O. Van Noorden Co., E., Boston, Mass. Vent-O-Lite Co., Chicago, Ill. (Ventilating, Industrial, Puttyless)

Ward Co., H. H., Chester, Pa.

Puttyless)
Ward Co., H. H., Chester, Pa.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

#### SKYLIGHT LIFTS See Lifts, Skylight

#### SMOKE PIPE See Pipe, Smoke

## SNIPS AND SHEARS, BENCH AND HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Throatless Shear Co., Chicago, Ill.
Bremil Mfg. Co., Erle, Pa. (Shears)
Clauss Shear Co., Fremont, O.
Compton Shear Co., W. H., Newark, N. J.

6. Tescent Tool Co., Jamestown, N. Y.
G. D. S. Machinery & Supply Co., New York City.
Grobet File Corp. of America, New York City.

6. Klenk's Aviation Snips, Wilmington, Del.

6. Marshalltown Mfg. Co., Marshalltown, Ia.

6. Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Penn Tool Company, Philadelphia.
Reiner & Campbell, Inc., New York City.
St. Louis Tool Co., St. Louis.
Viking Shear Co., Erle, Pa.

6. Wiss & Sons Co., J., Newark, N. J.

#### SOLDER

•Allen Co., L. B., Chicago, Ill. (Aluminum and Stainless Steel)

Allen Co., L. B., Chicago, Ill. (Aluminum and Stainless Steel)
Alpha Metal & Rolling Mills, Inc., Brooklyn.
American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Andrews Lead Co., Inc., Long Island City, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
Eagle-Picher Co., Cincinnati, O. (Bar and Wire)
Empire Metal Co., Syracuse, N. Y.
Flemm Lead Co., Inc., Long Island City.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Handy & Harmon, New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Co., Lloyd S., Chicago.
Johnston Tin Foil & Metal Co., St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
McNamee Products, Glencoe, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Motex Metal Process Corporation, Detroit.
National Lead Co., Columbus, O. (Acid and Rosin Core)
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

#### SOLDERING COPPERS

See Coppers, Soldering

SOLDERING FLUX See Flux, Soldering

#### SOLDERING FURNACES

See Furnaces, Soldering

SOLDERING IRONS See Coppers, Soldering

SOLDERING TORCHES

See Torches, Soldering

SOLENOID VALVES

See Valves, Solenoid

#### SOUND LEVEL INDICATORS

See Indicators, Sound Level

#### STAMPINGS, METAL

Ames Co., W. R., San Francisco.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bossert Company, Inc., Utica, N. Y.
Bridgeport Brass Co., Bridgeport, Conn.
Budke Stamping Co., Canonsburg, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Commercial Shearing & Stamping Co., Youngstown, O.
Continental Machines Incorporated, Minneapolis.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Edwards Mfg. Co., Inc., Cincinnati.
Friedley-Voshardt Co., Chicago, Ill.
General Blower Corp., San Francisco.

General Metal Products Co., St. Louis, Mo.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Gillian Mfg. Co., Detroit.
Globe Machine & Stamping Co., Cleveland, O.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Mayville, Wis.
Morrison Products, Inc., Cleveland.
Morrison Steel Products, Inc., Buffalo, N. Y.
Mullins Mfg. Co., Warren, O.
National Manufacturing & Engineering Co., Detroit.
New Monarch Machine & Stamping Co., Des Moines, Ia.
Niles Steel Products Div., Republic Steel Corp., Niles, O.
Osborn Co., J. M. & L. A., Cleveland, O.
Republic Steel Corporation, Cleveland.
Standard Pressed Steel Co., Jenkintown, Pa.
Ostandard Stamping & Perforating Co., Chicago, Ill.
Tannewitz Works, Grand Rapids, Mich.
Worcester Pressed Steel Co., Worcester, Mass.

## STAMPINGS, STEEL FURNACE

 Commercial Shearing & Stamping Co., Youngstown, O.
 (Flanged and Dished Heads for Furnace Domes, Radiator Crescent Heads, Hat Pipes)

#### STOKER CONTROLS

See Controls, Stoker

#### STOKERS, DOMESTIC (Up to 61 lb. per hr.)

(Up to 61 lb. per hr.)

Advance Appliance Co., Peoria, Ill.
Air Conditioning & Stokers, Inc., St. Louis.
Airtemp, Inc., Dayton, O.
American Furnace Co., St. Louis.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Stoker Corp., Indianapolis, Ind.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Beckley Perforating Co., Garwood, N. J. (Anthracite)
Blufton Mfg. Co., Findlay, O.
Bovee Furnace Works, Waterloo, Ia.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownie Stoker Co., Decatur, Ill.
Browneil Co., Dayton, O.
Burnham Stoker Co., Vancouver, Wash.
Burnwell Corp., Allentown, Pa.
Butler Street Foundry & Iron Co., Chicago, Ill.
Carrier Corp., Syracuse, N. Y.
Chicago Automatic Stoker Co., Inc., Chicago, Ill.
Comet Electric Company, Indianapolis, Ind.
Conce Corporation, Mendota, Ill.
Cooper & Cooper, Inc., Pittsfield, Mass. (Anthracite)
Crane Co., Chicago. (Bituminous & Anthracite)
Crouch Corporation, Birmingham, Mich.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Des Moines Stove Repair Co., Des Moines, Ia.
Dickson & Eddy, New York City.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Econocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.

Dowagiac Steel Furnace Co., Dowagiac, Mich.
Econocol Stoker Div. of Cotta Transmission Corp., Rockford,
Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., New York City.
Fairbanks, Morse & Co., Chicago, Ill.
Finnell Rotary Stokers, Inc., Elkhart, Ind.
Flynn and Emrich Co., Baltimore, Md.
Frederick Iron & Steel Co., Frederick, Md.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Fuel Savers, Inc., Harrisburg, Pa.
Furnaceslave, Inc., Indianapolis, Ind.
Gehl Bros., Inc., West Bend, Wis.
General Machine Co., Inc., New York City.
General Stokers, Inc., Philadelphia. (Anthracite)
Gilt Edge Furnace & Mfg. Co., Milwaukee.
Green Colonial Furnace Co., Des Moines, Ia.
Grossenbacher Furnace Co., St. Louis.

Hall-Neal Furnace Co., Indianapolis, Ind.
Hamilton Automatic Stoker Corp., Hamilton, O.
Heating Assurance, Spokane, Wash.
Hemp Co., Macomb, Ill.
Heritage Stoker Sales, Inc., Chicago, Ill.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Homer Furnace & Foundry Corp., Coldwater, Mich.
Ideal Furnace Co., Detroit.
Illinois Iron & Bolt Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Keith Furnace Co., Des Moines, Ia.
Kol-Master Corp., Oregon, Ill.
Leach Co., Oshkosh, Wis.
Link-Belt Co., Chicago, Ill.
McLouth Air Conditioning Corp., Lansing, Mich.
Index to Advertisers, page 304

Meyer Furnace Co., Peoria, Ill.
 Micro-Westco, Inc., Bettendorf, Ia.
 Moloch Foundry & Machine Co., Kaukauna, Wis.
 Motorstokor Div. of Hershey Machine & Foundry Co., Man-

Molcoh Foundry & Machine Co., Kaukauna, Wis.
Motorstokor Div. of Hershey Machine & Foundry Co., Manheim, Pa.
Muncie Gear Works, Inc., Muncie, Ind.
Murray Corporation of America, Detroit.
National Steam Pump Co., Upper Sandusky, O.
National Stoker Factory Sales Co., St. Louis.
Northern Steel & Stoker Corp., Peoria, Ill.
Palmer Mfg. Co., Cleveland.
Peerless Mfg. Co., Louisville, Ky.
Plymouth Industries, Inc., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., Cleveland.
Pulvokol, Inc., Minneapolis, Minn. (Pulverized Coal Burner)
Racine Stoker Mfg. Co., Racine, Wis.
Rudy Furnace Co., Dowagiac, Mich.
Schwab Safe Co., Lafayette, Ind.
Schwab Safe Co., Lafayette, Ind.
Scott Engineering Co., Noblesville, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Standard Stoker Corporation, New Albany, Ind.
Steel Products Engineering Co., Springfield, O.
Stok-A-Fire Co., Inc., University City, Mo.
Stokerette Mfg. Co., Chicago, Ill.
Stokermatic Co., Salt Lake City, Utah.
Stoker Products, Inc., Decatur, Ill.
Susquehanna Engineering Co., Bloomsburg, Pa.
Toledo Stoker Co., Toledo, O.
Tropic-Air Stoker Co., New London, O.

OU. S. Machine Corporation, Lebanon, Ind.
Whiting Corp., Stoker Division, Harvey, Ill.
Will-Burt Co., Orrville, O.
York Ice Machinery Corporation, York, Pa.

## STOKERS, INDUSTRIAL AND COMMERCIAL (61 lb. to 300 lb. per hr.)

American Coal Burner Co., Chicago, Ill.
American Engineering Co., Philadelphia.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Stoker Co., Auburn, Ind.
Auburn Stoker Corp., Milwaukee.
Babcock & Wilcox Co., New York City.
Bluffton Mfg. Co., Findlay, O.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Burke Stoker & Mfg. Co., Chicago.
Burnham Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Chicago Automatic Stoker Co., Inc., Chicago, Ill.
Columbus Metal Products Inc., Columbus, O.

Conco Corporation, Mendota, Ill.
Crown Iron Works, Minneapolis, Minn.
Delta Stoker Co., Detroit and Monroe, Mich.
Econocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace Man, Inc. New York City

ord.

uis.

1941

Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., New York City.
Diamond Castings Co., Johnsonburg, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Firemood Machine Wks., Converse, Ind.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Co., Frederick, Md.
Front Rank Furnace Div., Liberty Foundry Co., St. Louis.
Fuel Savers Inc., Harrisburg Pa.
Gehl Bros. Mfg. Co., West Bend, Wis.
General Machinery Co., Spokane, Wash.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.

General Machinery Co., Spokane, Wash.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Raids, Mich.

Hall-Neal Furnace Co., Indianapolis, Ind.
Hamilton Automatic Stoker Corp., Hamilton, O.
Hare Stoker Corp., Detroit, Mich.
Heating Assurance, Spokane, Wash.
Hemp Co., Macomb, Ill.
Her-Born Eng. & Mfg. Co., Sandusky, O.
Heritage Stoker Sales, Inc., Chicago, Ill.
Hoffman Combustion Eng. Co., Detroit.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Illinois Iron & Bolt Co., Chicago, Ill.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Kol-Master Corp., Oregon, Ill.
Leffel & Co., James, Springfield, O.
Leach Co., Oshkosh, Wis.
Link-Belt Co., Chicago, Ill.
McLouth Air Conditioning Corp., Lansing, Mich.
Mallory Sales Co., Dolton, Ill.
Marion Machine Foundry & Supply Co., Marion, Ind.
Mesker & Co., Geo. L., Evansville, Ind.

Mesker & Co., Geo. L., Evansville, Ind.

Advertisement in this issue

Motorstokor Div. of Hershey Machine & Foundry Co., Man-

Motorstokor Div. of Hershey Machine & Foundry Co., Melm, Pa.

Muncie Gear Works, Inc., Muncie, Ind.

National Steam Pump Co., Upper Sandusky, O.

Neemes Foundry Inc., Troy, N. Y.

Northern Steel & Stoker Corp., Peorla, Ill.

Ornsby-Osterman Co., St. Louis, Mo.

Over-Spred Stoker Co., Ottawa, Ill.

Patterson Foundry & Machine Co., East Liverpool, O.

Peabudy Engineering Corp., New York City.

Perfection Grate & Stoker Co., Springfield, Mass.

Plymouth Industries, Inc., Plymouth, Ind.

Pocahontas Fuel Co., Inc., Cleveland.

Racine Stoker Mfg. Co., Racine, Wis.

Riley Stoker Corp., Worcester, Mass.

Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.

Schwab Safe Co., Lafayette, Ind.

Schwitzer-Cummins Co., Indianapolis, Ind.

Sinker-Davis Co., Indianapolis, Ind.

Standard Stoker Corporation, New Albany, Ind.

Steel Products Engineering Co., Springfield, O.

Stok-A-Fire Co., Inc., University City, Mo.

Stoker Products, Inc., Decatur, Ill.

Susquehanna Engineering Co., Bloomsburg, Pa.

Taylor Engineering Co., Cincinnati, O.

Tropic-Air Stoker Corp., Fort Wayne, Ind.

Wayne Oil Burner Corp., Fort Wayne, Ind.

Whiting Corp., Stoker Division, Harvey, Ill.

Will-Burt Co., Orrville, O.

#### STRAINERS, CONDUCTOR See Fittings and Accessories, Conductor

STRAPS, LEADER See Fittings and Accessories, Conductor

## SWITCHES, MAGNETIC

Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
Automatic Switch Co., New York City.
Bender Warrick Corp., Birmingham, Mich.
Clark Controller Co., Cleveland.
Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Detroit Lubricator Co., Detroit, Mich.
Dunn Inc., Struthers, Philadelphia, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn. (Mercury Tube)
Industrial Engineering Corp., Evansville, Ind.
Jefferson Electric Co., Bellwood, Ill.

McDonnell & Miller, Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., Baltimore, Md.
Palmer Electric Co., Chicago.
Pern Electric Co., Chicago.
Perne Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric & Mfg. Co., East Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago.

#### SWITCHES, MANUAL

Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Electric Co., Hartford, Conn.
Bender Warrick Corp., Birmingham, Mich.
Cutler-Hammer, Inc., Milwaukee, Wis.
Durakool, Inc., Elkhart, Ind. (Mercury)
Electric Controller & Mfg. Co., Cleveland, O.

General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Industrial Engineering Corp., Evansville, Ind.
Square D Co., Detroit, Mich.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## SWITCHES, TIME

Au-Temp-Co. Corp., New York City.
Automatic Temperature Control Co., Inc., Philadelphia.
Clark Cooper Co., Philadelphia.
Cramer Company, Inc., R. W., Centerbrook, Conn.
Detroit Lubricator Co., Detroit.
Edison, Inc., Thomas A., Instrument Div., West Orange,
N. J.

- ●General Controls Co., Glendale, Cal.
  General Electric Co., Schenectady, N. Y.
  Gleason-Avery, Inc., Auburn, N. Y.
  Guardian Electric Mfg. Co., Chicago, Ill.
  Herske & Timmis, Inc., New York City.
  Industrial Engineering Corp., Evansville, Ind.
  ●Mercoid Corp., Chicago, Ill.
  ●Minneapolis-Honeywell Regulator Co., Minneapolis.
  Paragon Electric Co., Chicago, Ill.
  ●Penn Electric Switch Co., Goshen, Ind.
  ●Perfex Corp., Milwaukee, Wis.
  Reliance Automatic Lighting Co., Racine, Wis.
  Rhodes, Inc., M. H., Hartford, Conn.
  ●Sampsel Time Control, Inc., Spring Valley, Ill.
  Sangamo Electric Co. Springfield, Ill.
  Spencer Thermostat Co., Attleboro, Mass.
  Tork Clock Co., Inc., Mt. Vernon, N. Y.
  Ward Leonard Electric Co., Mt. Vernon, N. Y.

TEES, FURNACE PIPE See Fittings and Accessories, Furnace Pipe

> TEMPERATURE CONTROLS See Thermostats

> TEMPERATURE RECORDERS See Recorders, Temperature

> > **TINPLATE** See Sheets, Tin

TIPS, DAMPER See Clips and Tips, Damper

#### THERMOMETERS, INDICATING

THERMOMETERS, INDICATING

Bacharach Industrial Instrument Co., Pittsburgh, Pa. Barclay, Inc., Robert, Chicago, Ill. (Flue Gas)
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeyvell Reg. Co., Philadelphia, Pa.
Builders Iron Foundry, Providence, R. I.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Defender Automatic Regulator Co., St. Louis.
Dickson Co., Chicago.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore.
G. M. Mfg. Co., New York City.
H-B Instrument Co., Inc., Philadelphia, Pa.

Illinois Testing Laboratories, Inc, Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corporation, Jas. P., Chicago.
Mason-Neilan Regulator Co., Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, New York City.
Palmer Co., Cincinnati.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York City.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

#### THERMOSTATS, DAY AND NIGHT, CLOCK

Au-Temp-Co Corp., New York City.

Detroit Lubricator Co., Detroit, Mich.

General Controls Co., Glendale, Cal.
General Electric Co., Bloomfield, N. J.
Gleason-Avery, Inc., Auburn, N. Y.

Mercoid Corporation, Chicago.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.

Sampsel Time Control, Inc., Spring Valley, Ill.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Wheelco Instruments Co., Chicago.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis, Mo.

## THERMOSTATS, HEAT ACCELERATED OR **ANTICIPATING**

Au-Temp-Co Corp., New York City.

•Automatic Products Co., Milwaukee, W.
Barber-Colman Company, Rockford, Ill.
Cook Electric Co., Chicago, Ill.
•Detroit Lubricator Co., Detroit, Mich.

Friez & Sons, Julien P., Baltimore.
Fulton Sylphon Co., Knoxville, Tenn.
General Controls Co., Glendale, Cal.
General Electric Co., Bloomfield, N. J.
H-B Instrument Co., Inc., Philadelphia, Pa.
Mercoid Corporation, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Precision Thermometer and Instrument Co., Philadelphia.
Spencer Thermostat Co., Attleboro, Mass.
Tagliabue Mfg. Co., C. J., Brooklyn.
White-Rodgers Electric Co., St. Louis, Mo.

#### THERMOSTATS, LINE VOLTAGE

THERMOSTATS, LINE VOLTAGE

Allen-Bradley Company, Milwaukee.
American Instrument Co., Silver Spring, Md.
Au-Temp-Co. Corp., New York City.

•Automatic Products Co., Milwaukee, Wis.
Barber-Colman Company, Rockford, Ill.
D. & M. Mfg. Co., Midland Park, N. J.

•Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia.
Edison, Inc., Thomas A., Instrument Div., West Orange,
N. J.
Friez & Sons, Julien P., Baltimore.

•General Controls Co., Glendale, Cal.
General Electric Co., Bloomfield, N. J.
H-B Instrument Co., Inc., Philadelphia, Pa.
Jefferson Electric Co., Bellwood, Ill.
•Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
•Penn Electric Switch Co., Goshen, Ind.
•Perfex Corp., Milwaukee, Wis.
Ranco Inc., Columbus, O.
Russell Electric Co., Chicago, Ill.
•Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.
•White-Rodgers Electric Co., St. Louis, Mo.

## THERMOSTATS, LOW VOLTAGE

Allen-Bradley Company, Milwaukee, Wis.
American Instrument Co., Silver Spring, Md.
Au-Temp-Co Corp., New York City,
•Automatic Products Co., Milwaukee, Wis.
Barber-Colman Company, Rockford, Ill.
Cook Electric Co., Chicago, Ill.
Crise Electric Mfg. Co., Mt. Vernon, O.
D. & M. Mfg. Co., Midland Park, N. J.
•Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange,
N. J.
Friez & Sons. Julien P., Baltimore.

Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.

Friez & Sons, Julien P., Baltimore.

General Controls Co., Glendale, Cal.
Gleason-Avery, Inc., Auburn, N. Y.

H-B Instrument Co., Inc., Philadelphia, Pa.
McCorkle Co., D. H., Berkeley, Cal.
Magnet Switch Co., Chicago.

Mercoid Corporation, Chicago, Ill.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago, Ill.

Sampsel Time Control, Inc., Spring Valley, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.

United Electric Controls Co., South Boston, Mass.

White Manufacturing Co., St. Paul, Minn.

White-Rodgers Electric Co., St. Louis, Mo.

#### THERMOSTATS, MODULATING OR PROPORTIONING

Atlas Valve Company, Newark, N. J. (Air Operated)
Au-Temp-Co Corp., New York City.
Barber-Colman Company, Rockford, Ill.
Defender Automatic Regulator Co., St. Louis.
H-B Instrument Co., Inc., Philadelphia, Pa.
Johnson Service Company, Milwaukee, Wis.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Tagliabue Mfg. Co., C. J., Brooklyn.

White Manufacturing Co., St. Paul, Minn.

#### THROUGH WALL FLASHINGS See Flashings, Through Wall

TIME SWITCHES See Switches, Time

TINNING FLUXES See Compounds, Tinning

## TOOLS, FIRING

Adams Company, The, Dubuque, Iowa.

Adams Company, The, Dubuque, Iowa.
Farrell-Cheek Steel Company, Stoker Parts Div., Sandusky, O. (Clinker Tongs, Rakes, Hooks, Slice Bars, Pokers, Back-up Wrenches)
Northwestern Stove Repair Co., Chicago.
Roesch & Associates, Inc., Syracuse, N. Y.
Stratton & Terstegge Co., Louisville, Ky. (Clinker Tongs)

#### TOOLS, METAL WORKERS'

●Champion Tool Co., Los Angeles, Cal. (Pipe Crimper)

●Crescent Tool Co., Jamestown, N. Y. (Scratch Awls, Pliers, Screw-drivers)

Greenlee Tool Co., Rockford, Ill. (Pipe Benders, Chisels, Screw Drivers)

Grobet File Corp. of America, New York City. (Files)

Hub Specialty Co., Somerville, Mass. (Awl)

Millers Falls Co., Greenfield, Mass. (Hack Saws)

Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary Hack Saw and Blades, and Hole Saw)

●Niagara Machine & Tool Works, Buffalo, N. Y.

Packham Crimper Co., Mechanicsburg, Ohio (Crimping Tongs)

Packham Crimper Co., Mechanicsburg, Ohio (Crimping Tongs)
Peck, Stow & Wilcox Co., Southington, Conn.
Pencilsharp Awl & Tool Co., Evansville, Ind. (Scratch Awls).
Penn Tool Co., Philadelphia. (Punches and Chisels)
Phillips Drill Co., Chicago. (Anchor Bolt Drill)
Poe, Ralph W., Canton, Ill. (Sheet Metal Cutters)
Reiner & Campbell, Inc., New York City. (Dividers)
Snap-On Tools Corp., Kenosha, Wis. (Hammers, Screw Drivers, Chisels, Punches, Wrenches, Soldering Irons & Pliers) & Pliers)

& Pliers)

Stanley Tools, New Britain, Conn. (Punches, Hammers, Drills)

Star Electric Motor Co., Bloomfield, N. J. (Drill Sharpener)

Whitney Mfg. Co., W. A., Rockford, Ill.

Whitney Metal Tool Co., Rockford, Ill.

Wodack Electric Tool Corp., Chicago. (Electric Hammer and Groover)

#### TOOLS, ROOFERS'

Aeroil Burner Co., Inc., West New York, N. J. (Melting Kettles, Hoists, Buckets, Tools and Accessories) All States Roofers Equip. & Mat'l Co., Chicago. (Complete Line)

Line)
Elermann Floor Scraper Co., Brooklyn, N. Y. (Tar)

Frey & Co., Frank P., Chicago.
Littleford Bros., Cincinnati, O.

Milcor Steel Co., Milwaukee, Wis.

Niagara Machine & Tool Works, Buffalo, N. Y.

Peck, Stow & Wilcox Co., Southington, Conn.

Pencilsharp Awl & Tool Co., Evansville, Ind.

Structural Slate Co., Penn Argyl, Pa. (Hammer, Ripper and Stake, also Portable Machine Cutter and Punch)

#### TOPS, CHIMNEY See Caps and Tops, Chimney

# TORCHES, BRAZING, CUTTING, WELDING, OXY-ACETYLENE

Aeroil Burner Co., Inc., West New York, N. J.
Air Reduction Sales Co., New York City.
Bastian-Blessing Co., Chicago, Ill.
Bernz Co., Inc., Otto, Rochester, N. Y. (Brazing)
Burdett Mfg. Co., Chicago, Ill.
Dockson Corporation, Detroit.
Gasweld Equipment Co., Chicago.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corporation, Detroit.

Johnson Gas Appliance Co., Cedar Rapids, Iowa.
Linde Air Products Co., The, New York City.
Marquette Manufacturing Co., Inc., Minneapolis.
Milburn Co., Alexander, Baltimore, Md.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
Reiner & Campbell, Inc., New York City.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Div., National Cylinder Gas Co.,
Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.

## TORCHES, SOLDERING

Bastian Blessing Co., Chicago.
Bernz Co., Inc., Otto, Rochester, N. Y.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Detroit Torch & Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Everhot Mfg. Co., Maywood, Ill.
Gasweld Equipment Co., Chicago.

Harris Calorific Co., Cleveland, O.

Hauck Mfg. Co., Brooklyn, N. Y.

Ideal Commutator Dresser Co., Sycamore, Ill.

Imperial Brass Mfg. Co., Chicago, Ill.

Insto-Gas Corporation, Detroit.

Johnson Gas Appliance Co., Cedar Rapids, Ia.

Linde Air Products Co., The, New York City.

Milburn Co., Alexander, Baltimore, Md.

Minn-Kota Foundry & Mfg. Co., Fargo, N. D.

Modern Engineering Co., St. Louis.

Reiner & Campbell, Inc., New York City.

Reliable Gas Products Co., Cedar Rapids, Ia.

Sight Feed Generator Co., Richmond, Ind.

Smith Welding Equipment Corp., Minneapolis, Minn.

Torchweld Equipment Div., National Cylinder Gas Co.,

Chicago, Ill.

Chicago, Ill. Turner Brass Works, Sycamore, Ill. Welding Apparatus Co., Chicago, Ill.

#### TRANSFORMERS, LOW VOLTAGE

Barber-Colman Co., Rockford, Ill.
Canatsey Electric Manufacturing Co., Kansas City, Mo.
Cook Electric Co., Chicago, Ill.
Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Ideal Commutator Dresser Co., Sycamore, Ill.
Jefferson Electric Co., Bellwood, Ill.
Mercoid Corporation, Chicago.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

#### TRIM, ORNAMENTAL See Moulding and Trim, Ornamental

#### TUBING, COPPER

TUBING, COPPER

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Hussey & Co., C. G., Pittsburgh, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
McDonnell & Miller, Chicago, Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., Cleveland.
Phelps Dodge Copper Products Corp., British American Tube
Div., New York City.
Revere Copper & Brass Incorporated, New York City.
Roberts Tube Works, Detroit.
Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
Streamline Pipe & Fittings, Div. of Mueller Brass Co., Port
Huron, Mich.
United States Brass & Copper Co., Hyde Park, Mass.
Wolverine Tube Co., Detroit, Mich.

## UNITS, WINDOW VENTILATOR AND FILTER

Ad-Lee Co., Inc., Chicago.
Airgard Manufacturing Co., Chicago.

Airmode Manufacturing Co., Chicago.

Amirton Co., Elimsford, N. Y.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Carrier Corp., Syracuse, N. Y.
Davies Air Filter Corp., New York, N. Y.
Fairbanks, Morse & Co., Chicago.
General Refrigeration Div., Yates-American Machine Co.,
Beloit, Wis.
Ilg Electric Ventilating Co., Chicago.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Kalser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis.
Mellish & Murray Co., Chicago.
Reed Unit-Fans, Inc., New Orleans, La.
Somers, Inc., H. J., Detroit, Mich.
Staynew Filter Corp., Rochester, N. Y.
Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
Unified Air Conditioner Co., Duluth, Minn.

eu. S. Air Conditioning Corp., Minneapolis.

eutility Fan Corporation, Los Angeles.

#### VACUUM CLEANERS FOR FURNACES See Cleaners, Vacuum, Furnace

#### VALVES, GAS PRESSURE REGULATING

Atlas Valve Co., Newark, N. J.

Barber Gas Burner Co., Cleveland, O.
Belfield Co., H., Philadelphia.

Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia.

1941

Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Defender Automatic Regulator Co., St. Louis.
Fisher Governor Co., Marshalltown, Ia.
Fox Control & Mfg. Co., Cleveland.
Friez & Sons, Julien P., Baltimore.
Fulton Sylphon Co., Knoxville, Tenn.
General Controls Co., Glendale, Cal.
Golden-Anderson Valve Specialty Co., Pittsburgh.
Hotstream Heater Co., Cleveland, O.
Mercold Corp., Chicago, Ill.
Milwaukee Gas Specialty Company, Milwaukee.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Co., Decatur, Ill.
Pacific Gas Radiator Co., Huntington Park, Cal.
Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfex Corporation, Milwaukee, Wis.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn.

## VALVES, HUMIDIFIER, WATER LEVEL

Automatic Humidifier Co., Cedar Falls, Ia.
Badger Mfg. & Sales Co., Milwaukee.
Barclay, Inc., Robert, Chicago.
Belfield Co., H., Philadelphia.
Bishop Humidifier Co., Detroit.
Chandler Co., Cedar Rapids, Ia.
Fisher Governor Co., Marshalltown, Ia.
G. & S. Tool Co., Detroit, Mich.
General Controls Co., Glendale, Cal.
Golden-Anderson Valve Specialty Co., Pittsburgh.

Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
OScovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
Skuttle Co., J. L., Detroit, Mich.
Supreme Electric Products Corp., Rochester, N. Y.
Universal Blower Co., Birmingham, Mich.
Viking Air Conditioning Corp., Cleveland.
Wisconsin Humidifier Co., Milwaukee, Wis.

## VALVES, SOLENOID

Albright Equipment Co., Pittsburgh.
Alco Valve Co., St. Louis, Mo.
Au-Temp-Co Corp., New York City.

Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., New York City.
Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia.
Brown Instrument Co., Diy. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cooper Co., Clark, Philadelphia, Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago.

Detroit Lubricator Co. Detroit.
Electric Valve Mfg. Co., Inc., New York City.
Electrimatic Corp., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Friez & Sons, Julien P., Baltimore.

General Controls Co., Glendale, Cal. (Magnetic)
General Electric Co., Schenectady, N. Y.
General Sales & Products Co., Cohoes, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Guardian Electric Mfg. Co., Chicago, Ill.
Hubbell Corp., Chicago.

Golden-Anderson Valve Specialty Co., Pittsburgh, Pa. Guardian Electric Mfg. Co., Chicago, Ill.
Hubbell Corp., Chicago.
Hunt & Son, C. B., Salem, O.

McDonnell & Miller, Chicago.

McConnell & Miller, Chicago.

Mercold Corp., Chicago, Ill.
Milwaukee Gas Specialty Company, Milwaukee.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Parker Appliance Co., Cleveland.

Penn Electric Switch Co., Goshen, Ind.

Perfex Corporation, Milwaukee, Wis.
Pfening Co., Fred D., Columbus, O.

Rega Mfg. Co., Rochester, N. Y.

Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarco Co., Inc., New York City.
Spoehrer-Lange Co., St. Louis.

Square D Company, Detroit.
Supreme Electric Products Corp., Rochester, N. Y.
Wheelco Instruments Co., Chicago.

White-Rodgers Electric Co., St. Louis.

• White-Rodgers Electric Co., St. Louis.

#### VANES, DUCT TURNING, PREFABRICATED

Barber-Colman Company, Rockford, Ill.

Tuttle & Bailey, Inc., New Britain, Conn.

Waterloo Register Company, Waterloo, Iowa.

#### VENTILATORS, CEILING

Airmaster Corp., Chicago, Ill.

•Auer Register Co., Cleveland, O.
Autovent Fan & Blower Co., Chicago, Ill.

Barber-Colman Company, Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Decatur Iron & Steel Co., Decatur, Ala.
Economy Electric Manufacturing Co., Cicero, Ill.
Falstrom Co., Passaic, N. J.
Gillian Mfg. Co., Detroit.
Hart & Cooley Mfg. Co., Holland, Mich.
Hudson Equipment Corp., Minneapolis, Minn.

\*Klauer Manufacturing Co., Dubuque, Ia.
\*Lamneck Products Co., Middletown, O.
Martin Metal Mfg. Co., Wichita, Kan.

\*Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.

\*Tuttle & Bailey, Inc., New Britain, Conn.

\*Universal Blower Co., Birmingham, Mich.

#### VENTILATORS, MUSHROOM

Aeolus Dickinson, Chicago, Ill.

Best Register Co., Milwaukee, Wis.
Falstrom Co., Passaic, N. J.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Knowles Mushroom Ventilator Co., Montclair, N. J.

Mueller Furnace Co., L. J., Milwaukee, Wis.

Tuttle & Bailey, Inc., New Britain, Conn.
Ventilating Products Co., Chicago.

## VENTILATORS, ROOF, FAN

VENTILATORS, ROOF, FAN

Aeolus Dickinson, Chicago, Ill.

Air Controls, Inc., Cleveland, O.
Airmaster Corp., Chicago, Ill.

Allen Corp., Detroit, Mich.
American-Larson Ventilating Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit, Mich.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilating Corp., New York City. (Turbine)
Chelsea Fan & Blower Co., Inc., New York City.
Clay Equipment Corp., Cedar Falls, Ia.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
DeBothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Company, Elizabethport, N. J.
Economy Electric Mfg. Co., Clicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Falstrom Co., Passaic, N. J.
Fingles Co., The, Baltimore, Md.
General Regulator Corp., Chicago, Ill.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand
Rapids, Mich.
Hirschman Co., Inc., W. F., Buffalo, N. Y. General Regulator Co., Milwaukee, Wis.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe and Dust Arrester Co.
Rapids, Mich.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co., S. M., Charlestown, Boston, Mass.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
Lohman Inc., William J., New York City.
Myers Electric Co., Pittsburgh, Pa.
New York Blower Co., Chicago.
Penn Ventilating Co., Philadelphia, Pa.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swartwout Co., Cleveland.
Trade-Wind Motor Fans, Inc., Los Angeles, Cal.
U. S. Air Conditioning Corp., Minneapolis.
Uno Ventilator Co., Cliftondale, Mass.
Utility Fan Corporation, Los Angeles.
Van Noorden Company, E., Boston.

Viking Air Conditioning Corp., Cleveland, O.
Washburne & Co., E. G., New York City.
Waverly Heating Supply Co., Boston.
Western Engineering & Mfg. Co., Los Angeles, Ca.
Wing Mfg. Co., L. J., New York City.

#### VENTILATORS, ROOF, GRAVITY

Accurate Mfg. Works, Chicago, Ill.
Aeolus Dickinson, Chicago, Ill.
Airtherm Mfg. Co., St. Louis, Mo.
Allen Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Metal Products, Fort Worth, Tex.

American Sheet Metal Works, New Orleans, La.
Ames Co., W. R., San Francisco, Cal.
Anderson Mfg. Co., Des Moines, Ia.
Arex Co., Chicago, Ill.
Autoforce Ventilating Systems, Boston.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Corp., New York City.
Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Clay Equipment Corp., Cedar Falis, Ia.
Day Co., The, Minneapolis, Minn.
Edwards Mfg. Co., Inc., Cincinnati, O.
Falstrom Co., Passaic, N. J.
Fingles Co., The, Baltimore, Md.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co., S. M., Charlestown, Boston, Mass.
Hudson Equipment Corp. Minneapolis, Minn.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Steel Co., Evansville, Ind.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jamar Co., Walker, Duluth, Minn.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.

Kleuer Manufacturing Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
Lambert Manufacturing Co., Whita, Kan.
Mellish & Murray Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milloro Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., Wishita, Kan.
Mellish & Murray Co., Chicago, Ill.
Penn Ventilating Co., Philadelphia, Pa.
(Milloro Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., Wishita, Pa.

Milloro Steel Co., Electon, Co., Philadelphia, Pa.
Ryalker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Electon, Minneapolis, Minn.
Tiffin Art Metal Co., Tiffin, O.
Uno Ventilator Co., Cliftondale

#### WARM AIR REGISTER SHIELDS

See Shields, Warm Air Register

#### WASHERS, AIR, HEATING AND VENTILATING (Capacity 4,000 c.f.m. and up)

(Capacity 4,000 c.f.m. and up)

Air & Refrigeration Corp., New York City.
Airwasher Corporation, Lansing, Mich.
American Blower Corp., Detroit, Mich.

American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W.R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco.
Ballantyne Co., Omaha, Nebr.
Bayley Blower Co., Milwaukee, Wis.
Betz Air Conditioning Corp., Kansas City, Mo.

Blishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.

Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
King Ventilating Co., Owatonna, Minn.
McLouth Air Conditioning Corp., Lansing, Mich.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Mellish & Murray Co., Chicago, Ill.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., Chicago, Ill.
Niagara Blower Co., Chicago, Ill.
Northern Blower Co., Cieveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., New York City.
Spray Engineering Co., Somerville, Mass.
Spray Wheel Air Conditioners, Inc., Denver, Colo.

Strandwitz & Co., Inc., W. J., Camden, N. J.

Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Heater & Ventilating Corp., St. Louis, Mo.
Tenney Engineering, Inc., Bloomfield, N. J.
Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
Trane Co., La Crosse, Wis.

U. S. Air Conditioning Corp., Minneapolis, Minn.
Utica Radiator Corp., Utica, N. Y.

Utility Fan Corporation, Los Angeles, Cal.
Vilter Mfg. Company, Milwaukee.
Western Blower Co., Seattle, Wash.
York Ice Machinery Corp., York, Pa.

### WATERPROOFING

Barrett Company, New York City.
Chase Brass & Copper Co., Waterbury, Conn.
Cheney Co., Philadelphia.
Flintkote Co., New York City.
General Insulating Products Co., Brooklyn, N. Y.
Horn Co., A. C., Long Island City.
Johns-Manville Sales Corp., New York City.
Koppers Company, Pittsburgh.
Lehon Company, Chicago.
Nebel Manufacturing Co., Cleveland.
Ruberold Co., New York City.
Sisalkraft Co., Chicago, Ill.
Truscon Laboratories, Detroit.
X-Pando Corporation, Long Island City, N. Y.

### WATER HEATERS

See Coils, Fire Pot, Hot Water

#### WELDERS, ARC

WELDERS, ARC

Adams Mfg. Co., J. D., Indianapolis, Ind.
Air Reduction Sales Company, New York City.
Allis-Chalmers Manufacturing Company, Milwaukee.
Alter-Arc Mfg. Co., Lawton, Okla.
Bear Mfg. Co., Rock Island, Ill.
Burke Electric Co., Erie, Pa.
Commonwealth Electric Welder Mfg. Co., Philadelphia.
Dynamic Welder Co., Chicago.

Eisler Engineering Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Emerson Electric Mfg. Co., St. Louis.
Ergolyte Mfg. Co., Philadelphia.

Fern, Ralph, Scranton, Pa.
General Equipment Co., Wichita, Kan.
General Electric Co., Schenectady, N. Y.
Glant Grip Mfg. Co., Oshkosh, Wis.
Hammett Mfg. Co., Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis. (Electric).
Hobart Brothers Co., Troy, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Lee & Son Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Maple Valley Mfg. Co., Mapleton, Ia.
Marquette Manufacturing Co., Inc., Minneapolis.
Miller Electric Mfg. Co., Inc., Appleton, Wis. (Portable)
Ohlo Welder Co., Middlefield, O.
Owen-Dyneto Div. USL Battery Corp., Syracuse, N. Y.
Pler Equipment Manufacturing Co., Benton Harbor, Mich.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Star Electric Motor Co., Bloomfield, N. J.
Trindl, Inc., Jos. H., Chicago.
Universal Power Corporation, Cleveland.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Nebr. (A. C.)
Wilson Welder & Metals Co., Inc., New York City.

## WELDERS, SPOT

•Acme Electric Welder Co., Huntington Park, Cal.
Agnew Electric Co., Milford, Mich.
Alphil Spot Welding Co., New York City.
Dyer Welder & Engineering Co., Kansas City, Mo.
•Elsler Engineering Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Machine & Welder Co., Warren, O.
General Electric Co., Schenectady, N. Y.
Micro Products Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Pier Equipment Manufacturing Co., Benton Harbor, Mich.
(Foot operated and motor driven.)
Taylor-Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O. (Butt and Seam)
Thomson-Gibb Electric Welding Co., Lynn, Mass.

941

Universal Power Corporation, Cleveland. Weldex, Inc., Detroit. Westinghouse Electric & Manufacturing Co., East Pitts-

### WELDING EQUIPMENT, OXY-ACETYLENE

Air Reduction Sales Co., New York City.
Automatic Gasflux Mfg. Co., Mansfield, O.
Bastian Blessing Co., Chicago, Ill.
Burdett Mfg. Co., Chicago, Ill.
Carbo-Oxygen Co., Pittsburgh, Pa.
Dockson Corporation, Detroit.
Gasweld Equipment Co., Chicago, Ill.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Jewel Mfg. Co., St. Paul, Minn.
Linde Air Products Co., The, New York City.
Marquette Manufacturing Co., Inc., Minneapolis.
Milburn Co., Alexander, Baltimore, Md.
Modern Engineering Co., St. Louis, Mo.
Ransome Concrete Machinery Co., Industrial Div., Dunellen, N. J. len, N. J.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Victor Equipment Co., Los Angeles, Cal.
Welding Apparatus Co., Chicago, Ill.

#### WELDING ROD

See Rod, Welding

## WELDING TORCHES

See Torches, Brazing, Cutting, Welding

#### WHEELS, BLOWER

- Advance Aluminum Castings Corp., Chicago, Ill.

  Air Controls, Inc., Cleveland, O.
  American Blower Corp., Detroit, Mich.
  Autovent Fan & Blower Co., Chicago, Ill.
  Bayley Blower Co., Milwaukee, Wis.

  Bishop & Babcock Mfg. Co., Cleveland.
  Buffalo Forge Co., Buffalo, N. Y.
  Champion Blower & Forge Co., Lancaster, Pa.

  Clarage Fan Co., Kalamazoo, Mich.
  Economy Electric Manufacturing Co., Cicero, Ill.
  Hastings Air Conditioning Co., Inc., Hastings, Nebr.
  Jaden Mfg. Co., Inc., F., Hastings, Nebr.
  Janette Mfg. Co., Chicago, Ill.

  Lau Blower Co., Dayton, O.
  Morrison Products, Inc., Cleveland.
  New York Blower Co., Chicago.
  Palmer's Manufacturing Corp., Phoenix, Ariz.

  Peerless Electric Co., Warren, O.

  Schwitzer-Cummins Co., Indianapolis, Ind.

- Sturtevant Co., B. F., Hyde Park, Boston, Mass Torrington Mfg. Co., Torrington, Conn.
  Triangle Mfg. Co., Oshkosh, Wis.
  U. S. Air Conditioning Corp., Minneapolis, Minn.
  Utility Fan Corporation, Los Angeles, Cal.
  Viking Air Conditioning Corp., Cleveland, O. Western Blower Company, Seattle, Wash.

### WINDOWS, HEAT INSULATING

Advance Insulating Co., Pittsburgh. Anderson Corp., Bayport, Minn. Chamberlin Metal Weather Strip Co., Det Detroit Steel Products Co., Detroit, Mich. Libbey-Owens-Ford Glass Co., Toledo, O. Russell Co., F. C., Cleveland, O. Truscon Steel Co., Youngstown, O.

### WINDOWS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La. Biersach & Neldermeyer Co., Milwaukee, Wis. Herrmann & Grace Co., Brooklyn, N. Y. International Steel Co., Evansville, Ind. Newman Brothers, Inc., Cincinnati, O. Perkinson & Brown, Chicago, Ill. Russell Co., F. G., Cleveland, O. Truscon Steel Co., Youngstown, O.

• Willis Mfg. Co., Galesburg, Ill.

## WIRE, PLAIN, GALVANIZED AND COPPERED

- Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless)
  Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
  American Nickeloid Co., Peru, Ill. (Chrome, nickel coated)
  American Steel & Wire Co., Chicago, Ill.
  Angell Nail & Chaplet Co., Cleveland.
  Berger Mfg. Div. Republic Steel Corp., Canton, O.

  Bethlehem Steel Co., Bethlehem, Pa. (Plain, galvanized)
  California Wire Cloth Corp., Oakland, Cal.
  Columbia Steel Co., San Francisco, Cal.
  Continental Steel Corp., Kokomo, Ind. (Plain, galvanized steel)
  Copperweld Steel Co., Glassport, Pa. (Copper covered steel)
- Copperweld Steel Co., Glassport, Pa. (Copper covered steel) Gulf States Steel Co., Birmingham, Ala. Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Galvanized)
- ized)
  Ludlow-Saylor Wire Co., St. Louis, Mo. (Cloth)
  Page Steel & Wire Div., Monessen, Pa.
  Republic Steel Corp., Cleveland, O. (Steel)
  Roebling's Sons Co., John A., Trenton, N. J.
  Seneca Wire & Mfg. Co., Fostoria, O.
  Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
  Townsend Co., New Brighton, Pa. (Plain and coppered)
  Wheeling Corrugating Co., Wheeling, W. Va.
  Wheeling Metal & Mfg. Co., Moundsville, W. Va.
  Wheeling Steel Corp., Wheeling, W. Va.
  Wickwire Spencer Steel Co., New York City.

  Youngstown Sheet & Tube Co., Youngstown, O.

### Section of

# American Artisan

# 1941 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

# Section 2—TRADE NAMES

- ABC-Blower-Filter and Blower-Washer American Blower Corp., Detroit.
- ABC-Air Conditioning Furnaces and Oil Burners. Automatic Burner Corp., Chicago, Ill.
- A. C.—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
- A-P-Controls, Motors, Thermostats, Valves. Automatic Products Co., Valves. Milwaukee, Wis.
- W.—Plates. Alan Wood Steel Co., Conshohocken, Pa.
- -Waterproofing Compounds, American Barlock Co., Inc., Long Island City, N. Y.
- asoweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Acco-Lastic—Caulking Compounds. Accurate Metal Weather Strip Co., New York, N. Y.
- -Mallets. Fowler Pem Co., Emeryville, Cal.
- -Peer-Arc and Spot Welders. Pier Equipment Mfg. Co., Benton Harbor, -Peer-Mich.
- Acidseal-Paint. B. F. Goodrich Co., Akron, O.
- Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

- Activ-Air Conditioning Furnaces.
  Heil Co., Milwaukee, Wis.

  Activ-Flame—Oil Burners. Heil Co.,
  Milwaukee, Wis.

  Aeracool—Fan Blades, Fans, Louvres
  and Shutters, Ventilators. Myers
  Electric Co., Pittsburgh, Pa.
- Aerisweld—Arc Welding Electrodes. Lin-coln Electric Co., Cleveland, O.
- Aero-Kitchen Exhaust Fans. Pryne & Co., Inc., Los Angeles.
- W. R. Ames Co., San Francisco, Cal.
- Aerofuse Air Diffusers. Tuttle & Bailey, Inc., New Britain, Conn. Aerolux-A. C. Furnaces. S. T. Johnson
- Co., Oakland, Cal. opel—Kitchen Exhaust Fans. American Blower Corp., Detroit, Mich.
- Aeroplane—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.
- roplez—Blowers. Milwaukee, Wis. -Blowers. Bayley Blower Co.,
- Aeropull-Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.
- Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.

  Aerovalve—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.
- Afco—Blowers, Blower-Filters, Furnaces and Stokers. American Furnace Co., St. Louis, Mo.
- Affico Grilles, Louvres, Registers. American Foundry & Furnace Co., Bloomington, Ill.
- Welding Electrodes. Agile Corp., Cleveland. American

- Agitair-Air Diffusers. Air Devices, Inc., New York City.
- Air-Acoustic Insulation. Johns-Man-ville, New York City.
- Airate-Fans and Ventilators. Air Controls, Inc., Cleveland.
- Air-A-Way Ventilators. America Metal Products, Fort Worth, Tex. American
- Airco-Electrodes, Soldering Flux, Welding Rod, Torches and Welding Equipment. Air Reduction Sales Co., New York City.
- -Con-Heating & Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Control-Air Conditioning Bearings, Blowers, Blower-Filters, Blower Housings and Wheels. Hastings Air Conditioning Co., Inc., Hastings, Nebr.
- Airex—Air Conditioning Units, Blowers and Fans. Mountain States Equip-ment Co., Denver, Colo.
- Air-Pan-Window Ventilators. Ad-Lee Co., Inc., Chicago.
- 10—Pipe, Fittings and Accessories. Milcor Steel Co., Milwaukee.
- Air-Plo-Shutters. Air Control Products, Inc., Muskegon, Mich.
- 10—Furnaces. Aladdin Heating Corp., Oakland, Cal. Airflo-Furnaces.
- Air-Plo-Ventilators. Belanger Fan & Blower Co., Detroit.
- AireOzonet—Air Conditioning Furnace.
  AireOzone Corp., Chicago.
- -RAY-ator-Furnaces. Burner Co., San Francisco.
- Airfoil—Fans and Fan Blades. vent Fan Co., Piqua, O.
- Airguide-Hygrometers and Thermome ters. Fee & Stemwedel, Inc., Chicago, Ill.
- Airite-Furnaces. Trane Co., La Crosse,
- Airkem—Chemical Odor Neutraliz Airox Company, New York City. Neutralizer.
- Airklenzer-Furnaces, Round Oak Co., Dowagiac, Mich. Air-Lift—Blowers and Fans. Engineering, Evanston, Ill.
- Airline-Furnaces, Joliet Heating Corp., Joliet, Ill.
- Airline—Registers & Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
- Air-Marvels-Fans. General Blower Co.. Philadelphia, Pa.
- AirMaster Blower-Washers and Air Washers. Airwasher Corp., Lansing, Mich.
- naster—Air Conditioning Units. Thatcher Co., Newark, N. J.
- AirMaster-Directional Flow Registers Waterloo Register Co., Waterloo, Ia. Airmat—Filters. American Air Filter Co., Inc., Louisville, Ky.
- Air-O-Matic—Air Conditioning Units. Williams Oil-O-Matic Htg. Corp., Bloomington, Ill.

- Airo-Flex-Registers. Auer Register Co., Cleveland.
- Air-O-Mist-Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.
- Air-Pak-Blower-Filter Units. Air Controls, Inc., Cleveland.
- Airplex Filters. Davies Air Filter Corp., New York, N. Y.
- Airpyrator Blowers. Burnwell Corp., Allentown, Pa.
- Airseal—Insulation. Rock Wood ucts Co., Inc., Wabash, Ind. Rock Wool Prod-
- tat—Controls, Minneapolis-Honey-well Regulator Co., Minneapolis. Airstat-Controls.
- Airstream Blower Wheels, Morrison Products, Inc., Cleveland.
- Air-Vane—Registers. Rock Island Register Co., Rock Island, Ill.
- Airvulo-Concrete Waterproofing Paint. Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.
- Ajax—Metal Shingles. Cincinnati Sheet Metal & Roofing Co., Cincinnati.
- Akron—Air Blast Furnaces. beger Co., Newark, Ohio.
- Star Radiator Co., Los Alaska—Coils. S Angeles, Cal.
- Alco-Roof Ventilators. Allen Corp., Detroit, Mich.
- Alcoa—Aluminum Products. Aluminum Co. of America, Pittsburgh, Pa.
- Allegheny—Air Conditioning Furnaces.
  Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- -Paint. Acme Refining Co., Cleveland.
- All-Metal-Solder. McNamee Products, Glencoe, Ill.
- All-Season-Air Conditioning Units. Fed-
- ders Mfg. Co., Buffalo.

  All-Sol—Flux. L. B. Allen Co., Chicago. Alltite—Insulation. Co Corp., Los Angeles. Coast Insulating
- Allvent—Window Ventilating Fans. Autovent Fan & Blower Co., Chi-
- cago.

  All-Weather—Roof Cement, Caulking
  Waterproofing Compounds Caulking and Waterproofing Compounds, Roofing Paint. Ford Roofing Products Company, Chicago.
- Furnace Brushes. Worcester Brush & Scraper Co., Worcester,
- Almar—Corner Lock Forming Machine. Ward Machinery Co., Chicago, Ill.
- Almetal-Fire Doors. Merchant & Evans Co., Philadelphia, Pa.
- Alnor—Thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
- Alumaweld—Flux and Solder. Lloyd S. Johnson Co., Chicago. Alumbrite-Paint.
- Thompson & Co., Pittsburgh, Pa. Alumi-Flux—Soldering Flux. L. B. Allen Co., Chicago, Ill.
- Alumilite-Aluminum Venetian Blinds.
- Chicago Venetian Blind Co., Chicago. Aluminweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

- Always Beliable—Soldering Furnaces, Torches. Otto Bernz Co., Inc., Rochester, N. Y.
- Ambrac-Welding Rod. American Brass Co., Waterbury, Conn.
- Amoo-Flux. American Solder & Flux Co., Philadelphia, Pa.
- American-Draft Gages. Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.
- Thermometers. American -Manning. Maxwell & Moore, Inc., Bridgeport, Conn.
- Amerock-Cabinet and Casing Hardware. American Cal Corp., Rockford, Ill. Cabinet Hardware
- Aminco-Anemometers. American strument Co., Silver Spring, Md.
- Amirglass—Air Filters. Amirton Co., Elmsford, N. Y.
- Anaconda—Copper and Brass Products.
  American Brass Co., Waterbury,
- Anchor-Furnaces, Oil Burners. Fargo Foundry Co., Fargo, N. D.
- Anchor-Roofing Nails. W. H. Maze Co., Peru, Ill.
- Anchor-Roofing Paint. A. Wilhelm Co., Reading, Pa.
- Anchor Brand-Nails, Rivets. Townsend Co., New Brighton, Pa.
- Anchor-Kolstoker-Stoker-fired Furnaces and Stokers, Anchor Stove & Range Co., New Albany, Ind.
- Anderson—Spray Nozzles. B. F. Sturtevant Co., Hyde Park, Mass.
- de—Arc Welding Electrodes. coln Electric Co., Cleveland, O.
- Appeo—Caulking Compounds, Paint.
  Asphalt Products Co., Syracuse, N. Y.
- Apex—Furnaces. Dallman Supply Co., Sacramento, Cal.
- Quadrants. Ohio Products Co., Cleveland, O.
- Apex—Hangers. Elbows and Fittings. Royal-Apex Mfg. Co., Brooklyn.
- Apollo-Roofing. Carnegie-Illinois Steel Co., Pittsburgh, Pa.
- Appoloy—Copper Steel. Company, Apollo, Pa. Apollo Steel
- Aqua Bar-Roof Cement. Continental Products Co., Euclid, O.
- Aqua-Flo-Pumps. The Heil Co., Milwaukee.
- Aqua-Master-Water Heaters. Century Eng. Corp., Cedar Rapids, Ia.
- Aqua-Scale Automatic Humidifier. P. Glasby Mfg. Co., Bloomfield, N. J. Aquiux-Water Heaters. S. T. Johnson
- Co., Oakland, Cal. Arc-Eng—Air Conditioning Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Arcmaster-Arc Welders, Bear Mfg. Co.,
- Rock Island, Ill.
- ArcoFlame-Oil Burners. American Rad. Standard Sanitary Corp., New York City.
- Arctio-Air Conditioning Units. Premier Furnace Co., Dowagiac, Mich.
- Ventilators. Arex Com-Arex-Austor pany, Chicago.
- Arin Accelerant—Louvers and Shutters.

  Arex Co.. Chicago.
- Arin Stationary—Louvers and Shutters. Arex Co., Chicago. Aristocrat-Fans, Torrington Mfg. Co.,
- Torrington, Conn. Aristocrat-Registers.
- Co., Cleveland, O. Armco-Plates, Sheets. American Roll-
- ing Mill Co., Middletown, O. Armorize-Paint. Carter Paint Co., Lib-
- erty, Ind. Armstrong—Compressors. General Machinery Co., Spokane, Wash.
- Arrow-Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

- -Ventilators. Uno Ventilator Co., Cliftondale, Mass.
- Arrowtrol Heating and Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Cincinnati Sheet Metal Art-Shingles. & Roofing Co., Cincinnati, O.
- Arteraft-Furnace Blowers, Ch Steel Furnace Co., Chicago, Ill. Chicago
- Asbestocel—Furnace Insulation. Johns-Manville, New York City.
- Asco-Relays, Switches, Valves. Auto-matic Switch Co., New York, N. Y.
- Aspro-Water-proofing Paint. Asphalt Products Co., Syracuse, N. Y. Ath-A-Mor - Furnaces. May-Flebeger
- Co., Newark, Ohio.
- Atlantic Breeze—Kitchen Exhaust Fans. Pryne & Co., Inc., Los Angeles. Atomist-Humidifiers. American Foun
- dry & Furnace Co., Bloomington, Ill. Attic Vent-Attic Fans. Belco Exhaust
- Fan Mfg. Co., St. Louis. Autocrat—Oil Burners. Chandler Company, Cedar Rapids, Iowa.
- Automatic—Air Conditioning Furnaces.
  Premier Furnace Co., Dowagiac,
- Automatic Drip Humidifiers. Automatic Humidifier Co., Cedar Falls,
- Automatik—Furnaces, Premier Furnace Co., Dowagiac, Mich.
- Aviation-Snips. Penn Tool Co., Philadelphia.
- Axiom-Filters. Blocksom & Company, Michigan City, Ind.

- Blast Gates, Roof Clips, Damper Clips and Tips, Conductor Fittings and Accessories, Snow Guards. Ber-ger Brothers Company, Philadel-
- -Closet-Type Gas-Fired Air Conditioning Unit. Surface Combustion Corp., Toledo, Ohio.
- BCA—Ball Bearings. Bearing Co. of America, Lancaster, Pa.
- -Air Conditioning Units, Blowers, Blower-Filters, Fans. Barrett En-Blower-Filters. gineers, Cleveland Heights, O.
- B. P. C .- Gas Burners, Moncrief Furnace & Mfg. Co., Dallas, Tex.
- B-H-Insulating Cement. Baldwin-Hill Co., Trenton, N. J.
- B-W-Relays, Switches. Bender rick Corp., Birmingham, Mich. Bender War-
- B & W-Refractories. Babcock & Wilcox Co., New York City.
- Badger-Time Switches. Reliance Automatic Lighting Co., Racine, Wis.
- Baertex—Floor and Dado Enamel. Baer Brothers, New York City.
- Ballard-Oil Burners and Furnaces. Gilbert & Barker Mfg. Co., Springfield,
- Ball Bearing—Damper Quadrants. Par-ker-Kalon Co., New York, N. Y.
- Bankheat-Oil Burners. S. T. Johnson Co., Oakland, Cal.
- Bar-Brook—A. C. Units, Fans, Heaters Shreveport Eng. Co., Inc., Shreve-
- Barcol—Controls, Motors, Thermostats. Barber-Colman Co., Rockford, Ill.
- Barlastic—Caulking Compounds. Barland Weatherstrip Material Co., Cleveland.
- Barry—Couplings, Pillow Blocks, Pulleys. R. & J. Dick Co., Inc., Passaic, N. J.
- mor Air Conditioning Furnace. Bastian-Morley Co., Inc., LaPorte, Basmor - Air Ind.
- Barton—Blower-Filters, Furnace Blowers, Cabinets and Casings, Air Conditioning and Gravity Furnaces, Heaters, Housings and Stampings. National Mfg. & Engineering Co., Detroit.

- Battery-Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- Bear Cat-Booster Fans. Midwestern Supply Co., Chicago.
- Beaver—Furnaces and Heaters. Danville Stove & Mfg. Co., Danville, Pa.
- Beckett Commodore-Oil Burners. R. W. Beckett Eng. Co., Elyria, O.
- Beehive—Roofing. Samuel Cabot, Inc., Boston, Mass.
- Beloit—Machines, Punches, Tools. Hend-ley & Whittemore Co., Beloit, Wis.
- Belt-Air-Ventilating Fans. Belco Exhaust Fan Mfg. Co., St. Louis. Bemis — Furnace Brushes. Worcester Brush & Scraper Co., Worcester,
- Mass. Benco-Oil Burners. Bennett Co., Omaha,
- Benefactor-Hess Warming -Furnaces.
- & Ventilating Co., Chicago, Ill. Bengal-Furnaces. Ryersford, Pa. Floyd-Wells Co.,
- Bennett-Allison-Oil Burners. Bennett
- Co., Omaha, Nebr. Berloy—Building Products. Berger Mfg. Co., Div. Republic Steel Corp., Can-
- ton, O. Berry-Cel—Insulation. F. E. Berry & Co., Everett, Mass.
- tossa—Furnaces. Parker Heating & Manufacturing Co., St. Petersburg, Bertossa
- h-Cu-Loy—Sheets. I Co., Bethlehem, Pa. Beth-Cu-Loy-Bethlehem Steel
- Bethlehem Dos-Oil Burners. Bethlehem Fdy. & Mach. Co., Bethlehem, Pa.
- Bettendorf-Oil Burners and Stokers. Micro-Westco, Inc., Bettendorf, Iowa.
- -Furnaces. Iowa Foundry Co., Big Sioux-Sloux City, Iowa.
- Biltwel-Furnaces. Fraser & Johnston Co., San Francisco.
- Bitugloss—Enamels & Lacquers, Wailes Dove-Hermiston Corp., Westfield, N. J.
- Black Diamond—Built-up Roofing. Bar-rett Co., New York, N. Y.
- Black Diamond—Furnaces, Heaters. Ma-ple City Furnace Co., Monmouth, Ill.
- Black Diamond-Stokers. Beckley Perforating Co., Garwood, N. J.
- Blo-Aire-Blower-Filter Units. Furnace Co., Peoria, Ill.
- Blow-Aire Blower Housings. Detroit Stamping Co., Detroit.
- Blo-Matic—Stokers, Her-Born Engineering & Mfg. Co., Sandusky, O. Blu-Pan—Kitchen Exhaust Fans. Pryne
- & Co., Inc., Los Angeles. Blue Enight—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Eliza-
- beth. N. J. Blue-Point—Drills, Tools. Snap-on Tools Corp., Kenosha, Wis.
- er Plate Furnaces. V. Heater Co., Cincinnati, O.
- Bon-Air—Blower Units, Furnaces. Rudy Furnace Co., Dowagiac, Mich.
- Boomer—Furnaces, Heaters. Hess-Sny-der Co., Massilon, O.
- Boost-Aire—Fans. L. J. Mueller Furnace Co., Milwaukee. Branford-Oil Burners, Malleable Iron
- Fittings Co., Branford, Conn. Breez-Air—Fans. Buffalo, N. Y. Buffalo Forge
- Breese-Oil Burners. Columbus Metal Products, Inc., Columbus, O.
- ezo—Kitchen Exhaust Fans. falo Forge Co., Buffalo, N. Y.
- Brevolite—Crackle Finish Paint, Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.
- Brookceil-Metal Ceilings. Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
- Brilliant Fire Floor Furnaces and Heaters, Ohio Foundry and Mfg. Co., Steubenville, O.

- Bull Dog-Snips and Shears. Wiss & Sons Co., Newark, N. J.
- Bung-Lo-Warm Air Furnaces. Geo. J. Cocking, Santa Ana, Cal.
- Burks-Pumps. Decatur Pump Co., Decatur, Ill.
- Burner-Set-Plibrico Jointless Firebrick Co., Chicago.
- But-M-tite-Steel Roofing. St. Paul Corrugating Co., St. Paul.
- Butler-Furnaces. Ramey Mfg. Co., Columbus, O.
- Buzzer—Gas Soldering Furnaces. Charles A. Hones, Inc., Baldwin, N. Y.

#### C

- -E-Stokers. Combustion Engineering Co., Inc., New York, N. Y. C-E-Stokers.
- C-E Skelly—Stokers. Combustion Engineering Co., Inc., New York City.
- C-H-Relays, Switches and Valves, Cut-ler-Hammer, Inc., Milwaukee, Wis.
- CID-Pumps. Goulds Pumps, Inc., Seneca Falls, N. Y.
- Calcor—Eaves Trough and Gutters, Louvers and Shutters, Damper Quadrants, and Skylight Lifts. California Cornice, Steel and Supply Corp., Los Angeles.
- Co., Marshall, Mich. Marshall Furnace
- wico-Wire Cloth. Califor Cloth Corp., Oakland, Cal. California Wire
- Camel-Valves. C. L. Bryant Corp., Cleveland, O.
- Capital—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.
- Capitol-Furnaces. United Sta diator Corp., Detroit, Mich. United States Ra-
- Capitol Rock Wool—Cement and Insula-tion. Standard Lime & Stone Co., Baltimore.
- Capitolaire—Furnaces. Un Radiator Corp., Detroit. United States
- Carbonaire-Oil Burners. Aldrich Co., Wyoming, Ill.
- Careycel-Insulation. Philip Carey Co., Cincinnati, O.
- Careyduct Prefabricated Ducts Philip Carey Co., Cincin-Fittings nati, Ohio.
- Carter-Oil Burners. General Oil Heating Corp., West New York, N. J.
- tional Heater Co., Utica, N. Y.
- scade—Desert Coolers. Todd Air Conditioning Co., Inc., Bonner Springs,
- Castable—Furnace Insulation. Munn and Steele, Inc., Newark, N. J.
- Castalu-Blower Wheels and Fans. vance Aluminum Castings Corp., Chicago, Ill.
- Caulk-O-Seal Caulking and Glazing Compounds. Calbar Paint & Var-Compounds. Calbar Paint nish Co., Philadelphia, Pa.
- Cel-Lux-Insulation. Norristown Mag-nesia & Asbestos Co., Norristown,
- Cementico—Concrete Waterproofing Paint. United States Gypsum Co.,
- Cementite—Paint. Pittsburgh, Pa. Thompson & Co.,
- Cementkote-Paint. Tropical Paint & Oil Co., Cleveland, O.
- pro-Concrete Paint. Asphalt Products Co., Syracuse, N. Y.
- Challenger-Stokers. Kol-Master Corp., Oregon, Ill.
- Chamberlin—Automatic Humidifier. Chandler Co., Cedar Rapids, Ia.
- Charavay Fans. Hartzell Propeller Fan Co., Piqua, O.
- Checker Coat-Galvanized Steel Sheets. Superior Sheet Steel Co. Div. Continental Steel Corp., Canton, O.

- rago—Brakes and Presses. Dre Krump Mfg. Co., Chicago, Ill. Chicago-
- Chicastic Castable—Refractory. Chicago Fire Brick Co., Chicago, Ill.
- Chico Brikset—High Temperature Ce-ment, Chicago Fire Brick Co., Chicago, Ill.
- Chief-Furnaces. Joliet Heating Corp., Joliet, Ill.
- Chieftain—Refrigerating Compressors. Tecumseh Products Co., Tecumseh,
- Chinook—Heating Coils. Bayley Blower Co., Milwaukee, Wis.
- Chinookfin—Heating Coils. Ba Blower Co., Milwaukee, Wis. Bayley
- Christie Furnace Vacuum Cleaners.
  Cincinnati Sheet Metal & Roofing
  Co., Cincinnati, O.
- Chromlead-Enamels omlead—Enamels and Lacquers. Dragert Co., C. H., Inc., Brooklyn.
- Chromweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Chronat—Furnace and Boiler Repairs. National Fdry. & Furnace Co., Dayton, O.
- Thermostats. Chronotherr Minne apolis-Honeywell Regulator Minneapolis, Minn.
- o-Louvers & Shutters. Circulators & Devices Mfg. Corp., New York City.
- CirCOOLator or — Fans and Ventilators. Air Conditioning Corpora-Viking tion, Cleveland, O.
- Circo-Ray-Floor Furnaces. Tenness Enamel Mfg. Co., Nashville, Tenn. Tennessee
- Circulaire-Heaters. J. V. Patten Co., Sycamore, Ill.
- Clamp On—Humidifier Fittings. Sallada Mfg. Co., Minneapolis, Minn.
- Classic-Registers. Auer Register Co.,
- Cleveland, O. Cleanaire—Blower-Filters. Peerless Foundry Co., Indianapolis, Ind.
- Cleveland-Furnaces, Dornback Furnace & Fdy. Co., Cleveland.
- Climate-Changer Air Conditioning Units. Trane Co., La Crosse, Wis.
- nate Maker—Furnaces, American Foundry & Furnace Co., Blooming-ton, Ill. American
- Climate Master--Oil Burning Air Condi-Furnace tioning Hess Warming & Ventilating Co., Chicago, Ill.
- Climator—Blower-Filter and Blower Washer Units. L. J. Mueller Fur-
- nace Co., Milwaukee. Clincher-Conductor Fittings and Accessories. Milcor Steel Co., Milwaukee.
- steel Co., New York City.
- Round Oak Co., Dowagiac, Mich. Coal Master -
- Cog-Belts-V-type Belts, Dayton Rubber Mfg. Co., Dayton, Ohio.
- -Light Weight Shar Colonial Alloys Co., Philadelphia.
- Coldstream—Air Conditioning Units. Baker Ice Machine Company, Inc., Omaha, Nebr.
- Colonial—Blower-Filters, Oil Burners, Furnaces, Humidifiers, Heaters, Stokers. Green Colonial Furnace Co., Des Moines, Ia.
- Colonial—Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn.
- Colonial-Registers. Auer Register Co., Cleveland, O.
- Colortipt—Arc Welding Electrodes. Wilson Welder & Metals Co., Inc., New York City.
- imbus—Ventilators. F. O. Schoedinger Co., Columbus, O. Columbus Ventilators.
- Combustioneer-Stokers, Steel Products Engineering Co., Springfield, O.
- Comet Exhaustair—Fans and Ventila-tors. New York Blower Co., Chicago, Ill.

- Comfort—Furnaces. J. B. Foote Foundry Co., Fredericktown, O.
- Comfort Air-Blower-Filter Units and Humidifiers. Comfort Products Corporation, Harvey, Ill.
- Comfortaire-Stokers. Hamilton Automatic Stoker Corp., Hamilton, O.
- Comfortmaker-Furnaces. Joliet Heating Corp., Joliet, Ill.
- Comfortrol-Blowers and Blower Units, Furnaces. Waterman-Waterbury Co., Minneapolis.
- Comfortrol-Effective Temperature Con-Julien P. Friez & Sons, Baltimore.
- Comfortzone—Furnaces. Michigan Tank & Furnace Corp., Detroit.
- Co-Min-Co-Insulating Cement. United States Mineral Wool Co., Chicago. Compact—Blowers. Bishop & Babcock Mfg. Co., Cleveland, O.
- Compact—Oil Burn Wyoming, Ill. -Oil Burners. The Aldrich Co.,
- Compactairs—Air Conditioning Fur-naces. Glasby Mfg. Co., Inc., J. P., Bloomfield, N. J.
- Conditioneer—A. C. Units. Star Stoker Corp., New Albany, Ind. Standard
- Condor-Belts. Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
- Control-O-Gas-Valves. & Supply Co., Beverly Hills, Cal.
- Controlaire-Furnaces. St. Louis Furnace Mfg. Co., St. Louis.
- Convector—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.
- -Humidifiers. Maid-O'-Mist, Convector-Inc., Chicago.
- Coolair—Blowers, Fans and Ventilators. American Coolair Corp., Jacksonville, Fla.
- Coolerair—Air Conditioning Units. Payne Furnace & Supply Co., Beverly Furnace & Supply Hills, Cal.
- Coolvent—Attic Fans. Autovent Fan & Blower Co., Chicago.
- Coppercote Copper Paint. America Coppercote, Inc., Brooklyn, N. Y.
- -Waterproofling. Cheney Co., Philadelphia.
- Copperior—Sheets. Superior Sheet Steel Co., Canton, O.
- Cop-B-Loy-Copper Bearing Steel Sheets. Wheeling Corrugating Co., and Wheeling Steel Corp., Wheeling, Bearing
- Corinco-Insulation. Cork Insulation Co., Inc., New York, N. Y.
- Corkboard—Insulation. Armstrong Cork Co., Lancaster, Pa.
- Corner Turn—Duct Turning Vanes. Waterloo Register Company, Waterloo, Ia.
- Coroaire—Air Conditioning Furnaces and Heaters. Corozone Air Condi-tioning Corp., Cleveland, O.
- Clark Dust Control Company, Chicago.
- -Air Conditioning Furnaces. Western Blower Co., Seattle.
- Crane Basmor-Bastian-Morley Co., Inc., LaPorte, Ind.
- ter—Furnaces. Dallman Supply Co., Sacramento, Cal.
- Crescent-Furnaces, Green Colonial Furnace Co., Des Moines, Ia.
- Corp., Hartford, Conn. Caloroll Burner
- Crescent—Skylights, Ventilators. American Sheet Metal Works, New Orleans, La. Crucibleweld—Arc Welding Electrodes. Westinghouse Electric & Mfg. Co.,
- Westinghouse Ele East Pittsburgh. Crusader-Oil Burners. Bethlehem Fdry.
- & Mach. Co., Bethlehem, Po Crystal—Crackle Finish Paint, Hilo Var-nish Corp., Brooklyn.

Custom-Aire-Furnaces and Heaters. Heating Equipment Co., San Fran-

D&E—Vacuum Furnace Cleaners, Sto-kers, Dickson Coal Co., New York City.

D-Q—Furnace Vacuum Cleaners. Demore-Quinlan Co., Kenosha, Wis.

Dailaire—Blower-Filters, Furnaces, Heaters, Humidifiers. McLouth Air Conditioning Corp., Lansing, Mich.

Dakota-Oil Burners. Co., Fargo, N. D. Fargo Foundry

Daptoblu-Gas Burners. Beck Engineering Combustion Kompany, St. Louis.

Deco-Metal Shingles. Cincinnati Sheet
Metal & Roofing Co., Cincinnati.
Decoseal—Aluminum Paint. Debevoise
Co., Brooklyn, N. Y.

Deflecto-Ventilators. The Day Co., Minneapolis, Minn.

Dehydrantine-Waterproofing. A. C. Horn Co., Long Island City.

Delco-Reat—Oil Burners, Furnaces, Motors, Pumps and Stokers. Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.

wxe—Air Conditioning Furnaces.
Williamson Heater Co., Cincinnati.

DeLuxe—Gravity Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.

DeLuxe—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

-Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

Dens-Pac—Asbestos Cement. Norristown Magnesia & Asbestos Co., Norristown, Pa.

Dependable—Paint. Heath & Milligan Mfg. Co., Chicago, Ill.

De-Pollenizer—Window Ventilator and Filter Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

Dereks-Paint. Debevoise Co., Brooklyn, N. Y.

stoker Co., Detroit and Monroe, Lostoker Detroit Mich.

Detroit UniStoker—Stokers. Detroit Stoker Co., Detroit and Monroe, Mich.

Dezert Kooler—Evaporative Conditioning Unit. Ut Conditioning Unit. Corp., Los Angeles. Utility Fan

Dial Damper-Draft Regulators. Parker-Kalon Corp., New York City.

Dial-Set Stokers. Kol-Master Corp., Oregon, Ill.

Diamond—Compounds, Enamels, Lacquers and Paint. Thompson & Co., Pittsburgh, Pa.

Diamond—Smoke Pipe Dampers. Adams Company, The, Dubuque, Ia.

Diamond H—Controls, Relays, Switches. Hart Mfg. Co., Hartford, Conn.

Dickinson—Dampers, Scuppers, Ventilators, Aeolus Dickinson, Chicago, Ill.

Dickrope-V-type Belts. R. &. J. Dick Co., Passaic, N. J.

Directaire—Air Conditioning Furnances.

Fitzgibbons Boiler Co., Inc., New

York City.

Do-All-Combination Hammer and Drill. Wodack Electric Tool Corp., Chicago.

Doall Metalmaster-Contour cutting saw. Continental Maporated, Minneapolis. Machines Incor-

Odor Adsorbers. Dorex Air Con-ioning Div., W. B. Connor Eng. ditioning Div., W. B. Corp., New York City.

Dorwil-Utility Room Furnaces. Gibraltar Engineering Co., Los Angeles.

Double Diamond—Humidistats, Psychrometers, Relays, Switches, Thermometers. H-B Instrument Company, Philadelphia, Pa.

Double-Duty-Oil Burners. Aldrich Co., Wyoming, Ill.

Double Radiator—Furnaces. Mueller Furnace Co., L. J., Milwaukee, Wis. Mueller

Double-Seal-Humidifier Fittings. Hays Mfg. Co., Erie, Pa.

Dover-Hangers. Reeves Steel & Mfg. Co., Dover, Ohio.

Dover-Imperial—Eaves Trough Hangers. Ohio Wire Products Co., Dover, O.

Dowagiac-Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Draftmaster-Regulators. Pia ucts Corp., Lansing, Mich. Piatt Prod-

Draft-O-Stat Draft Regulators and Smoke Pipe Dampers. Hotstream Heater Company, Cleveland.

Draftrite—Draft Gages. Bacharach Industrial Instrument Co., Pittsburgh.

Dri-Lap—Roofing. Globe Iron Roofing & Corrugating Co., Cinicinnati, O.
Dri-W-Tite—Cement. A. C. Horn Co.,
Long Island City, N. Y. Driwal-Waterproofing Compound. The

Glidden Co., Cleveland. Dual-Air-Ventilators. General Regula-

tor Corp., Chicago, Ill.

Dual-Clone-Blow Pipe Collectors. Day Co., Minneapolis.

Duckseal—Waterproofing Compound. Acorn Refining Co., Cleveland.

o—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington,

Ductone—Electrodes. Chica Wire Company, Chicago. Chicago Steel &

Ducturns-Vanes. Tuttle & Bailey, Inc., New Britain, Conn.

Products, Inc., South Bend, Ind.

Dulux—Enamels and Lacquers. E. I. du Pont\_de Nemours & Co., Wilmington, Del.

Dunco—Relays, Switches, Thermostats. Struthers Dunn, Inc., Philadelphia,

Duotherm-Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

Duplex-Flashings. Chase Brass & Copper Co., Inc., Waterbury, Conn.

Dura-Furnaces, Heaters. Barry Furnace Co., Hamilton, O.

DuraBilt-Registers. Auer Register Co., Cleveland, Ohio.

Dura-A-Ble—Furnaces. St. I nace Mfg. Co., St. Louis. St. Louis Fur-

Dura-Flex—Directional Flow Registers.
Auer Register Co., Cleveland. Dura-Line-Registers, Auer Register

Co., Cleveland. onze—Sheets. Bridgeport Brass Co., Bridgeport, Conn.

Dura-Steel-Registers. Middleton Mfg. & Sales Co., Minneapolis.

DustStop — Filters. Owens-Corning Fiberglas Corp., Toledo, Ohio.

Dux-Bac—Shingles.
Milwaukee, Wis. Milcor Steel Co.,

Dux-Sulation-Duct Insulation. Grant Wilson, Inc., Chicago, Ill.

Dynaflow-Blowers. South Bend Air Products, Inc., South Bend, Ind.

## Е

Eagle Star—Solder. Eag Co., Cincinnati, Ohio. Eagle-Picher Lead

Super—Insulating Cement and ashing. Eagle-Picher Lead Co., Flashing. Cincinnati, O.

Eagle Tin-Loy — Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, Ohio.

Earle—Ventilators. Berger Bros. Co., Philadelphia, Pa.

Easy-Buffers, Grinders, Polishers and Sanders. Detroit Surfacing Machine Co., Detroit.

Easy Bead-Eaves Trough and Gutters. St. Paul Corrugating Co., St. Paul.

Easy-Slip — Conductor Pipe. Eaves Trough and Gutters. La Crosse Steel Roofing & Corrugating Co., La

Economy-Power Hack Saws, F. L. Robertson, Buffalo.

Economy—Furnaces, Heaters. International Heater Co., Utica, N. Y.

nomy—Adjustable Buffing Hoods. Kirk & Blum Mfg. Co., Cincinnati, O. Economy-Registers. Auer Register Co.,

Cleveland, Economy-Ventilators. Arex Company. Chicago.

Econo-Therm—Registers. Middleton Mfg. & Sales Co., Minneapolis. EDA—Punches. Wiedemann Machine

**EDA**—Punches. Wiedema Company, Philadelphia.

Edge Seal-Filters. Wilson & Co., Inc., Chicago.

Edgers—Hand Flanging Machines. Pack-ham Crimper Co., Mechanicsburg, Ohio.

Effico-Louvres, Skylights, Ventilators. W. F. Hirschman Co., Inc., Buffalo.

Elasticon—Roofing Paint. A. C. Horn Co., Long Island City.

Elastikote—Paint. Tropical Paint & Oil Co., Cleveland, O.

Dryol - Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Electric City—Gutter Forming Machines. F. L. Robertson, Buffalo.

Electric Filter Watchman-Air Gauge. Herbusch Corp., St. Louis.

Electric Purnace Man-Domestic Stoker. Machine Co., Inc., New York City.

Janitor—Controls and Regula-Minneapolis-Honeywell Regu-Electric Janitortors. tor Co., Minneapolis, Minn.

American Electro-Matic-Filters. Filter Co., Inc., Louisville, Ky.

Electro-Sheet—Roofing. American Brass Co., Waterbury, Conn.

Electrol-Air — Air Conditioning Furnaces. Associated Air Conditioning Corp., St. Louis, Mo.

Electrolaire—Air Conditioning Furnaces. Electrol Incorporated, Clifton, N. J. Electro Way-Fans. Ward Mfg. Co., De-

troit, Mich. Electro-Wind-Ventilators. Allen Corp.

Detroit. Glykol — Waterproofing Cmpound. Gerard Chemical Co., Elizabeth, N. J.

Elite—Registers. Auer Register Co., Cleveland, O.

Empire—Mallets. G New York City. Greene, Tweed & Co.,

Endurance—Cement and Paint. Glidden Company, Cleveland. Sheets. Republic Steel Corp.,

Cleveland, O. Epco-Perforated Metals. Erdle forating Co., Rochester, N. Y.

Equator—Furnaces and Heaters. Lennox Furnace Co., Marshalltown,

Flanging and Shrinking nines. Engineering and Res chines. Research

Corporation, Riverdale, Md. Esco—Smoke Pipe Dampers. Eselgroth & Co., Newark, N. J.

Esico-Electric Soldering Coppers and Furnaces. Electric Soldering Iron Co., Inc., Deep River, Conn.

Esso-Oil Burners, Furnaces. Gilbert & Barker Mfg. Co., Springfield, & Ba Mass.

-Paint. Barrett Co., New Eternium-York City.

Eureka-Furnaces. Home Stove Co., Indianapolis, Ind.

Evanair-Oil Furnaces and Gas Heaters, Evanoil Heater Div., Evans Products

- Evanoil-Oil Heaters. Evanoil Heater Div., Evans Products Co., Detroit.
- Evansway—Furnaces. Corp., Moline, Ill.
- Evco-Valves. Electric Valve Mfg. Co., New York, N. Y.
- Everdur Plates, Sheets, Structural Shapes, Welding Rod. American American Brass Co., Waterbury, Conn.
- Everjet-Roofing Paint. Barrett Co., New York City.
- Everlast-Furnaces. Pacific Gas Radiator Co., Los Angeles, Cal.
- Everwear Metal Ceilings. Eaves Trough and Gutters with Fittings, Conductor Pipe, Ridge Rolls and Ridging, Roofing, Metal Shingles and Tile, Ventilators. Southern States Iron Roofing Co., Savannah,
- E-Z-On—Damper Clips and Tips, and Damper Regulators. M. A. Gerett Co., Milwaukee.

- P & D-Refractories. General Insulat-ing Products Co., Brooklyn.
- -Underfeed Stokers. Flynn & Emrich Co., Baltimore, Md.
- Pabrikated—Grilles, Registers. Inde-pendent Register Co., Cleveland, O.
- Paceweld—Are Welding Electrodes. Lincoln Electric Co., Cleveland.
- co—Sheets, Fairmont Aluminum Co., Fairmont, W. Va.
- Pamous—Oil Burners. E Furnace Co., Chicago. Excelsior Steel
- ParQuar—Furnaces. Farquhar Furnace Co., Wilmington, O.
- Pavorite-Furnace and Smoke Pipe Fittings and Accessories. W Heater Co., Cincinnati, O. Williamson
- Peatherfin—Coils. L. J. Wing Mfg. Co., New York, N. Y.
- P Electric-Fan Roof Ventilators Hirschman Co., Inc., Buffalo, F. H.

g

n

r-

n,

ch

th

nd

we

n-

41

- estra—Heat Insulating Windows. Detroit Steel Products Co., Detroit.
- Rotary-Roof Ventilators. Waverly Heating Supply Co., Boston.
- Ferrobord Steel Roofing. T Steel Co., Youngstown, Ohio. Truscon
- Perroclad—Building Insulation. con Steel Co., Youngstown, O.
- Perrocraft-Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
- Ferro-Therm Insulation. American Flange & Mfg. Co., Inc., New York.
- roweld—Arc Welding Electrode Lincoln Electric Co., Cleveland, O. Electrodes.
- Owens-Corning Piberglas - Insulation. Fiberglas Corp., Toledo, Ohio.
- Pilteraire Window Ventilator filter units. Davies Air Filter Corp., New York City.
- ered Aire—Blower-Filters. American Foundry & Furnace Co., Blooming-ton, Ill. Piltered Aire-
- Findley Stokers. Bluffton Mfg. Co., Findlay, O.
- Pine Air—Air Conditioning Units. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
- Pin-Flex—Registers. The Auer Register Co., Cleveland.
- **Fin-Line**—Registers, The Auer Register Co., Cleveland.
- orete—Refractories. Johns-Manville, New York, N. Y.
- Piredaire Circulating Heaters. wards Mfg. Co., Inc., Cincinnati. Farrell-Cheek
- Pire-Pixer—Firing Tools, Far Steel Co., Sandusky, Ohio.
- -Cement, Johns-Manville, New York, N. Y.

- Fire-King -- Stokers. Sinker-Davis Co., Indianapolis, Ind.
- Pire Tender—Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
- Pirma—Ventilators, W. F. Hirschman Co., Inc., Buffalo, N. Y.
- Pitchburg—Oil Burners. E. W. Skinner Co., Fitchburg, Mass.
- Fitrits—Conductor, Eaves Trough and Gutter Fittings and Accessories, Skylight Lifts, Snow Guards, Ventilators. David Levow, New York, or Rival Strap Corp., New York City.
- Pitzgibbonsaire Air Conditioning Unit. Fitzgibbons Boiler Co., New York City.
- Fixit—Cement. National Mfg. Corp., Tonawanda, N. Y.
- Plash-Rite-Flashings. The Figge Mfg. Co., Chicago, Ill.
- Fleetweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Pleur de Lis-Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.
- Flexair—Registers and Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
- Flexaro—Arc Welders, Westinghouse Electric & Mfg. Co., East Pittsburgh.
- "Plexiblac"-Paint. Samuel Cabot, Inc.,
- -Furnaces. Floral City Co., Monroe, Mich.
- ezy—Solder. Merchant & Evans Co., Philadelphia, Pa. Floery.
- Plor-Aire-Floor Furnaces. ler Furnace Co., Milwaukee.
- Florence-Furnaces. Emrich Co., Inc., Columbus, Ohio.
- Flosol-Flux, American Chemical Paint Co., Ambler, Pa.
- Flo-Warm—Coal, Oil, Gas and Stoker-Fired Furnaces. Williamson Heater Co., Cincinnati, Ohio.
- Plualyzer—Portable CO<sub>2</sub> Analyzer. Chas. Engelhard, Inc., Newark, N. J.
- Forbes Syphonaire—Ventilators. West-ern Engineering & Mfg. Co., Los Angeles.
- Forbes Tri-Pellerbes Tri-Peller—Fans. Western Engineering & Mfg. Co., Los Angeles.
- Ford-V-Neer—Building Insulation. Ford Roofing Products Co., Chicago.
- Porest Fleece—Insulation. John J. Do-heny Co., Belmont, Mass.
- Porstair Gas Circulating Heaters. Per-not & Rich, Inc., Los Angeles.
- oo—Metal Ceilings, Skylights, etc. F. O. Schoedinger Co., Columbus, O.
- nkin Stokers. Columbus Metal Products, Inc., Columbus, O.
- Freefio-Grilles. Trane Co., LaCrosse, Wis.
- Stokers. Illinois Iron & Bolt Co., Chicago, Ill. Holtum Mfg.
- Presport—Oil Burners. Co., Freeport, Ill.
- Frigid—Night Air Cooling and Exhaust Fans and Fan Blades. Circulators & Devices Mfg. Corp., New York City.
- Front End-Paint. Barrett Co., New York, N. Y.
- Pros-T-aire Air Conditioning Units. Palmer's Manufacturing Corp., Phoe-
- scope—Controls. Taylor Instrument Companies, Rochester, N. Y.
- ton—Copper Paint. Debevoise Co., Brooklyn, N. Y.
- Fulton-Register Shield with Humidi-fier. Patent Novelty Co., Fulton, fler. Ill.
- -feeder-Stokers, American Coal Burner Company, Chicago, Ill.
- Pyre-Chek-Draft Regulators. Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

- Pyrite—CO<sub>2</sub> Analizers. Bacharach Industrial Instrument Co., Pittsburgh.
- Pyr-Fly-Oil Burners. The Aldrich Co., Wyoming, Ill.

## G

- G. B. C.—Blowers and Fans. General Blower Co., Philadelphia.
- G-E—Air Conditioning Units, Oil Burn-ers, Compressors, Controls, Solder-ing Coppers, Couplings, Electrodes, Fans, Flux, Furnaces, Humidistats, Fans, Flux, Furnaces, Humidistats, Motors, Relays, Switches, Trans-formers, Solenoid Valves, Thermo-stats, Welders. General Electric Co., Bloomfield, N. J., and Schenectady,
- G-M-Grilles, Louvres, Shutters, Perforated Metals, Registers, Register Shields, Metal Stampings, Venter Shields, Metal Stampings, Ven-tilators. Gillian Mfg. Co., Detroit.
- G. B.—Air Conditioning Units, Ventilators and Filter Units. General Refrigeration Div., Yates-Amer--Air Conditioning Units, Window
- Gal-va-nite—Roof Cement, Waterproofing Compounds, Paint. Ford Roofing Products Co., Chicago.
- Gantz—Furnace Lighter for Coal and Coke. American Furnace Lighter Sales Co., St. Louis.
- Garland—Furnaces, Heaters, D. Michigan Stove Co., Detroit.
- Gas-Era—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.
- Gas King-Furnaces, J. King Kent Co., St. Louis.
- Gasmaster-Furnaces Rybolt Heater Co., Ashland, Ohio.
- Gastite Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.
- Gas-Vac-Furnaces and Heaters. uum Gas Appliance Div., Fork & Hoe Co., Rome, N. Y. Union
- -Furnaces. Robinson Furnace Co., Chicago, Ill.
- Gem-Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.
- -Compressors. General Machinery Co., Spokane, Wash
- Gen-Arc Welders. General Equipment Co., Wichita, Kan.
- Genasco-Cement, Compounds, ings, Paint, Asbestos Paper, Roofing. Barber Asphalt Corp., Barber, N. J.
- General—Heaters, Agricola Furnace Co., Inc., Gadsden, Ala.
- General Aire Com-pany, Philadelphia.
- Generator—Colls. H. Co., Cleveland, O. Hotstream Heater
- Genii-Oil Burner. Nu-Way Corp., Rock Island, Ill.
- Genuine Detroit -Controls, Humidistats. Motors, Relays, Switches, Thermostats and Transformers. Detroit Lubricator Co., Detroit, Mich.
- Giant-Oil Burners. Aldrich Co., Wyoming, Ill.
- Giant Nite—Fans, Ventilators. Russell Electric Co., Chicago, Ill. Gibraltar—Furnace and Heaters. P. H. MaGirl Foundry & Furnace Works, Bloomington, Ill.
- Gilbarco Air Conditioning Units, Blower-Filter Units, Furnaces, and Draft Regulators. Gilbert & Bar-
- ker Mfg. Co., Springfield, Mass.
- L. Gillen Co., Dowagiac, Mich.
- & Mfg. Co., Alexandria, Ind. Gimco Sealal-Rock Wool Bats.
- eral Insulating & Mfg. Co., Alexandria, Ind. Mfg. Co., Cleveland. Nebel

- be—Eaves Trough and Gutters, Pipe, Ridge Rolls and Ridging, Roof-ing, Sheets, Shingles and Tile. New-Globe-Eaves Trough port Rolling Mill Co., Newport, Ky.
- Globe-Ventilators. J. M. & L. A. Os-born Co., Cleveland.
- Glo-Pyr-Oil Burners. Aldrich Co., Wyoming, Ill.
- Glowan—Gas Burners. J. O. & C. U. Martin, San Francisco.
- Gnome-Oil Burners. Aldrich Co., Wyoming, Ill.
- Gohl—Eaves Trough & Gutters, Pipe, Sheets, Ridge Rolls and Ridging, Roofing. Newport Rolling Mill Co., Newport, Ky.
- Golden Eagle—Evaporative Coolers.
  Great National Air Conditioning
  Corp., Dallas, Tex.
  Golden Eod-Air Conditioning Units,
  Fans, Window Ventilators and
  Wheels, Blowers. F. Jaden Mfg.
  Co., Inc., Hastings, Nebr.
  Gordon—Gas Conversion Burners. Rob-
- erts-Gordon Appliance Corp., Buf-
- Gradutrol Controls. Minneapolis-Honeywell Regulator Co., Minneap-
- -Variable Speed Pulleys. Briggs & Stratton, Milwaukee.
- Grand Rapids-Vacuum Furnace Clean-Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
- Graylite—Building and Duct Insulation, Insulite Co., Minneapolis, Minn.
- Grid—Heating and Cooling Coils. D. Murray Mfg. Co., Wausau, Wis. D. J.
- Grillometer—Direct Reading Air Velocity Meter. Detroit Air Meter Co., Detroit, Mich.
- Grossenbacher Furnaces. Grossenbacher Furnace Co., St. Louis.
- Gulfsteel—Nails, Plates, Ridge Rolls and Ridging, Roofing, Sheets, Wire. Gulf States Steel Co., Birmingham,
- East Sheet Metal Works, Long Beach,

## Н

- -Gas Conversion Burner. Handley Brown Heater Co., Jackson, Mich.
- HairBestos-Insulation. Wilson & Co., Inc., Chicago, Ill.
- Haircraft—Insulation. Inc., Chicago, Ill. Wilson & Co.,
- Hall Cooler-A. C. Units. Hall Manufacturing Co., Cedar Rapids, Ia.
- Hammerkraft—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn.
- -Punches. National Machine Tool Co., Racine, Wis.
- Handy-Pipe, Prefabricated Ducts and Fittings. F. Meyer & Bro. Co., Pe-Fittings. oria, Ill.
- Handy-Andy-Clinker Tong. Northwest-ern Stove Repair Co., Chicago, Ill.
- Handy Change—Arc Welders, Maple Valley Mfg. Co., Mapleton, Iowa. Happy Thought Heaters. Pittston
- Stove Co., Pittston, Pa.
- **Example 1** Are Welding Electrodes. Lincoln Electric Co., Cleveland, O. Health Air—Blowers, Furnaces, Humidi-fiers. Economy Baler Co., Ann Ar-
- bor, Mich. Health-Air—Window Ventilator-Filters. Ad-Lee Co., Inc., Chicago.
- Health-aire—A. C. Units, Blower, Coils, Fans, Louvers and Shutters and Ventilators. Johnson Fan & Blower Corp., Chicago, Ill.
- Healthmaster—Blowers, Ducts and Fit-tings, Furnaces, Heaters. Chand-Chandler Co., Cedar Rapids, Iowa.
- Heat-Aid—Furnace Linings. F Products Co., Cleveland, Ohio. Pyrolite

- Heat Breaker—Fa Houston, Tex. -Fans. Esko Mfg. Corp.,
- Heatcote-Paint. Debevoise Co., Brooklyn, N. Y.
- Eestwave Furnaces. Co., Tulsa, Okla. Stephens Mfg.
- Heath Dual-Range Draft Gage. De-troit Air Meter Co., Detroit.
- Burners & Heating Utilities, Inc., Brooklyn, N. Y. Heat-O-Meter-Heat Savers.
- Heat-Pak-Oil Burners. Wyoming, Ill. Aldrich Co.,
- Heatrola-Heaters. Estate Stove Co., Hamilton, O.
- Heatseal-Insulation. Ehret M. Mfg. Co., Valley Forge, Pa. Ehret Magnesia
- Heat-X-Tractor-Heat Savers. Oil Burners & Heating Utilities, Inc., Brooklyn, N. Y.
- Heavyduty-Damper Quadrants. ker-Kalon Corp., New York, N. Y.
- **Meetrozone,** The Air Conditioning Units. American Air Conditioning Co., Minneapolis, Minn.
- Hellite Refractories. Johns-Manville, New York, N. Y. Hercules—Fan Roof Ventilators. W. F.
- Hirschman Co., Inc., Buffalo, N. Y.
- Rercules Furnaces. Johnston Gas Furnace Corp., North Hollywood, Cal.
- **Hercules**—Gravity Roof Ventilators. Berger Bros. Co., Philadelphia.
- -Heaters. J. V. Patten Co., Sycamore, Ill.
- Hev-E-Oil-Oil Burners, Sanmyer Corp., Chicago.
- Hi-Boy-Furnaces. Ala Corp., Oakland, Cal. Aladdin Heating
- Highflex-Belts. B. F. Goodrich Co., Akron, O.
- Highway—Copper Iron. Apollo Steel Co., Apollo, Pa.
- Reat—Enamels and Lacquers, Aluminum Paint. J. H. Krehbiel Co. Chicago.
- Hilume-Aluminum Paint. Hilo Varnish Corp., Brooklyn.
- Eltonoast-Grilles. Tuttle & Bailey, Inc., New Britain, Conn.
- Hodell—Furnace Chain. Chain Products Co., Cleveland. Hoffman-Oil Burners. Shedlov
- Burners, Inc., Minneapolis, Minn.
- Hold Heat—Soldering Coppers. ?
  Brass Works, Sycamore, Ill. Turner
- Hold-Heet—Controls, Thermostats, Transformers. Russell Electric Co., Chicago, Ill.
- Holgun-Portable Electric Drills, Black & Decker Mfg. Co., Towson, Md.
- Holtite-Phillips—Screws and Bolts. Continental Screw Co., New Bedford, Mass.
- e-Furnaces. Rock Island Stove Co., Rock Island, Ill. Home-Furnaces.
- Home Comfort—Blowers, Furnaces. St. Louis Furnace Mfg. Co., St. Louis,
- nilator—Ventilating Fans. Kisco Company, Inc., St. Louis. Homilator-
- Hot Blast-Soldering Furnaces and Torches. Turner Brass Works, Sy-Torches. Tu
- Ectco—Furnaces, Oll Burners. Hotentot Co., Inc., Omaha, Nebr.
- Hot Spot-Electric Welders, Acme Electric Welder Co., Huntington Park, Cal.
- Wave—Coils. Rudy Furnace Co., Dowagiac, Mich.
- Howle—Heat Savers. Condensation Engineering Corp., Chicago, Ill.
- Hoyt-Roofing. National Lead Co., New York, N. Y.
- Huber-Overfeed Stokers. Flynn & Emrich Co., Baltimore, Md.
- Humidair-Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.

- Humidair—Washers. American Foundry & Furnace Co., Bloomington, Ill.
- Humidaire—Humidifiers. American Humidaire Corp., Grand Rapids, Mich.
- **Eumidiguide**—Hygrometer. Taylor Instrument Companies, Rochester,
- Humidostat Humidistats. Johnson Service Co., Milwaukee, Wis.
- Rumitherm—Air Conditioning Units. Grinnell Co., Inc., Providence, R. I.
- Humphrey—Furnaces. General Gas Light Co., Kalamazoo, Mich. Hydronon—Concrete Waterproofing Paint. Barrett Co., New York City.
- Hydro-Proof Water-Proofing Com-pounds. Asphalt Products Co., Syra-cuse, N. Y.
- **Hy-Duty**—Bearings, Blades, Fans, Blowers, Housings, Pumps, Venti-lators, Wheels. Schwitzer-Cummins Co., Indianapolis, Ind.
- Hy-Power-Furnaces. Rudy Furnace Co., Dowagiac, Mich.
- Hy-Power—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

  Hytemp—Insulation. Keasbey & Matti-
- son Company, Ambler, Pa.
- Hytest—Paint. National Mfg. Co., Ton-awanda, N. Y.
- IEC—Relays, Switches. Industrial Engineering Corp., Evansville, Ind.

  Ice-O-Matio—Compressors. Williams
  Oil-O-Matic Heating Corp., Bloomington, Ill.
- Ideal—Air Conditioning Units. Norge Heating & Conditioning Div.—Borg-Warner Corp., Detroit, Mich.
- Ideal—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.
- Ideal—Roofing Nails. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Ideal (Air Cell)—Insulation. Hinde & Dauch Paper Co., Sandusky, Ohio.
- Ilgair—Fans. Ilg Electric Ventilating Co., Chicago, Ill.
- tte Kitchen Exhaust Fans. Electric Ventilating Co., Chicago.
- Impact—Spray Nozzles. Phillips Cooling Tower Co., Inc., New York City.
- Imperial—Hangers. Berger Bros. Co., Philadelphia, Pa.
- Inco—Paint. Inter-Coastal Paint Co., East St. Louis, Ill.
- Inco-Welding Rod. International Nickel Co., Inc., New York City.
- Independent Furnaces. Independence Stove & Furnace Co., Independence, Mo.
- Indian-Furnaces. Dowagiac Steel Furnace Co., Dowagiac, Mich.
- Indian—Oil Burners. Pioneer Manufac-turing Co., Cedar Rapids, Ia.
- IngAclad—Plates and Sheets. Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
- Ingle-Oil Burners and Furnaces. National Iron Works, San Diego, Cal.
- Ins-Lite—Building and Duct Insultion. Insulte Co., Minneapolis. Chi-
- duma—Insulating Fire Brick. Ch cago Fire Brick Co., Chicago, Ill. Insalums-Insa-Lute—Furnace Cement and Paint. Sauereisen Cements Co., Pittsburgh,
- Interlock-Pipe. Milcor Steel Co., Milwaukee, Wis.
- Invisible Joint-Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.
- Ironite-Hot Surface Paint. Acorn Refining Co., Cleveland.
- Ironset—Furnace Cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
- Fronside-Paint. Thompson & Co., Pittsburgh, Pa.

- nental Stove Corp., Ironton, O. Conti-
- Isl City—Registers. Rock Island Register Co., Rock Island, Ill.
- Iso-Tem-Automatic Heat Control. Tem Products Co., Midland, Pa.

- Insulation, Roofing. Johns-Man-ville, New York, N. Y.
- J.M.C .- Oil Burners. Johnson Mfg. Co., Waterloo, Iowa.
- Jack Prost-Insulation. Barrett Co., New York City.
- Janitrol—A. C. Units, Gas Burners, Furnaces. Surface Combustion Corp.,
- Jennings-Pumps. Nash Engineering Co., South Norwalk, Conn. Detroit-
- rel—Furnaces, Heaters. D Michigan Stove Co., Detroit. Hotstream Heater Co.,
- Jiffee Coils. H. Cleveland, O.
- Jointite—Insulation. Mundet Cork Corp., New York, N. Y.
- Jordan &cro-Ventilators. Paul R. Jordan & Co., Inc., Indianapolis, Ind.
- Jordan Centripeller—Attic Fan. Paul R. Jordan & Co., Inc., Indianapolis, Ind. Jumbo-Oil Burners. The Aldrich Co.,
- Wyoming, Ill.
- Juneaire Furnaces. American Foundry & Furnace Co., Bloomington, T11.
- iata—Soldering Flux. Geo. W. Die-ner Mfg. Co., Chicago, Ill. Juniata
- Junior-Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.
- Juskite L-BO-Ducts and Furnace Pipe and Fittings. Corbman Bros., Inc., Philadelphia, Pa.

- K-B—Damper Clips, Tips and Regulator Sets. G. L. Kerentoff, Cincinnati.
- B—Eaves Trough and Gutters, Pipe, Ridge Rolls and Ridging, Roofing and Sheets. Newport Rolling Mill Co., Newport, Ky.
- E.S.V .- Ventilators. Kernchen Co., Chicago, Ill.
- East Erush-Roof Strainers. Grand Rapids Wire Products Co., Grand Rapids Wire Rapids, Mich.
- Karatez—Insulation, Blocksom & Com-pany, Michigan City, Ind.
- Kathabar A. C. Units. Surface Combustion Corp., Toledo, O.
- Kelsey-Bradley-Furnaces. Kelsey Heating Co., Inc., Syracuse, N. Y.
- mick—Paint. American Chemical Paint Co., Ambler, Pa. Kemick-Paint.
- -Flue Gas Analyzers, Controls, Humidifiers, Damper Motors, Ther-mometers and Valves. Barclay, Inc., Robert, Chicago.
- Keystone-Heaters. J. V. Patten Co., Sycamore, Ill.
- rstone Sheets. Carnegie Illinois Steel Corp., Pittsburgh, Pa. Keystone .
- Insulation. Kimberly-Clark Corp., Chicago. Elecco—Roof Cement, Waterproofing Compounds, Paint. Geo. B. Klee Co.,
- Cincinnati.
- Kleeco Caulk—Caulking Compounds. Geo. B. Klee Co., Cincinnati. - Filters. Air-Maze Corp.,
- Cleveland.
- Klixon—Controls, Switches, Humidistats, Motors, Relays, Switches, Thermo-stats. Spencer Thermostat Co., At-
- Kitchenaire-Fans. Allen Corp., Detroit. Enock-Out—Arc Welders, Buffers, Grind-ers, Polishers and Sanders. K. O. Lee & Son Co., Aberdeen, S. D.

- Kno-Draft—Ceiling Ventilator. Pland-aire, Inc., Pittsburgh.
- Enox—Smoke Pipe. Waterloo Register Co., Waterloo, Ia.
- **xo**-Oil Burning Water Heaters. Automatic Humidifier Co., Cedar Falls,
- ire—Air Conditioning Units. U. Air Conditioning Corp., Minne-Kold-Aire apolis.
- Kolostat-Furnace Draft Regulator. P. C. Timm & Son, Lincoln, Neb.
- -Ventilators. Milcor Steel Co., Milwaukee, Wis.
- Kooler-Aire—Blower Washer Combina-tions. U. S. Air Conditioning Corp., Minneapolis.
- Koppax-Paint. Koppers Co., Pittsburgh, Pa.
- Kor-Nor-Lok-Pittsburgh Lock Forming Machine. Binkley Mfg. Co., War-Machine. renton, Mo.
- **Eristokrak** Enamels and Lacquers. Zapon Brevolite Division Atlas Powder Co., North Chicago, Ill.
- Enchn's—Gutters, Ridge Rolls and Ridg-ing. Milcor Steel Co., Milwaukee.

## 1

- L. A. Motors. Louis Allis Co., Milwaukee, Wis.
- Instruments. Leads & Northrup Co., Philadelphia, Pa.
- R—Conductor Pipe. Lamb & Ritchie Co., Cambridge, Mass.
- -Flexible Couplings. Lovejoy Flexible Coupling Co., Chicago, Ill.
- L-U—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
- -Lacquers. Glidden Company, Cleveland.
- Lakeside—Blowers. Furblo Co., Her-mansville, Mich.
- r. H. Langsenkamp Co., Indianapolis, Ind.
- Lastik Wampum—Cement Paint. Lastik Products Co., Inc., Pittsburgh.
- Lawson Heaters. Continental Stove Corp., Ironton, O.
- dclad—Eaves Trough and Gutters, Fittings, Ridge Rolls and Ridging, Sheets, Shingles and Tile, and Wire, Wheeling Metal & Mfg. Co., Mounds-ville, W. Va.
- Leader—Oil Burners. Pressure Oil Burners, Inc., York, Pa.
  Leader—Oil Burners and Circulating Heaters. Victor Oil Burner Mfg. Co., Hartford, Conn.
- d-Seal-Roofing Nails. The Deniston Co., Chicago,
- Lectrik Ice—Refrigerating Compressors.
  Uniflow Mfg. Co., Erie, Pa.
- Pro-Shear—Portable Electric Shears.
  Black & Decker Mfg. Co., Towson,
  Md. and Van Dorn Electric Tool Co.,
  The, Towson, Md.
- igh—Furnaces, Heaters. Pittston Stove Co., Pittston, Pa.
- Leonard-Circulating Oil Heater. W. R. Ames Co., San Francisco.
- LeBoy—Fan and Gravity Roof Ventila-tors. W. F. Hirschman Co., Inc., Buffalo, N. Y.
- Liberty-Paint, Carter Paint Co., Liberty, Ind.
- Liberty-Ventilators. Penn Ventilating Company, Philadelphia.
- Lifetime—Furnace Pipe Fittings & Accessories. Campbell Heating Co., Des Moines, Ia.
- Lightweld—Arc Welding Electroder Lincoln Electric Co., Cleveland, O.
- Stokers. John R. Carnes, Inc.,
- Lincoln-Furnaces and Heaters. American Foundry & Furnace Co., Bloom-

- Linc-Weld-Motors. Lincoln Electric Co., Cleveland, O.
- Lindsay-Framing. Dry-Zero Corporation, Chicago.
- Products Co., Cincinnati, Ohio. Linges !-
- Lipman-Coils, Compressors. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Liquid Elastigum—Paint and Roofing Cement. Barrett Co., New York City.
- Little Blacksmith—Punches and Slitting Machines. J. F. Kidder Mfg. Co., Inc., Burlington, Vt.
- Little Giant—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
- Llemroc Fire Doors. Cornell Iron Works, Inc., Long Island City, N. Y.
- Lloyd's—Stainless Soldering Flux. Lloyd S. Johnson Co., Chicago.
- Blast—Gas Conversion Burners, National Machine Works, Chicago, Ill.
- Lo-Boy-Stokers. Whiting Corp., Harvey, Ill.
- Lock-Joint-Pipe and Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee.
- Lok-Joint—Building Insulation. Insulite Co., Minneapolis, Minn.
- Lornate—Chimney Caps & Tops, Venti-lators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
- Lo-Maintenance—Electric Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Acid Brushes, Compounds, Flux, Solder. Thos. F. Lukens Metal Co., Philadelphia, Pa.
- Ludlite—Stainless Steel, Roofing and Sheets. Allegheny Ludlum Steel Corp., Brackenbridge, Pa.
- Lumino-Paint. Koppers Co., Pittsburgh, Pa.
- Lumitall—Aluminum Paint, Mfg. Co., Tonawanda, N. Y.
- Luxaire—Blower-Filters, Oil Burners, Furnaces and Humidifiers. The C. A. Olsen Manufacturing Co., Elyria, O.
- Lyonore nore—Sheets. Lyon-Conklin & Co., Inc., Baltimore.

- M & E-Compressors, Solder. Merchant & Evans Co., Philadelphia, Pa.
- M.P.C.—Gas Floor Furnaces. Moncrief Furnace & Mfg. Co., Inc., Dallas,
- & H-Zinc Sheets. Matthiessen & Hegeler Zinc Co., LaSalle, Ill.
- M & M-Humidiflers nad Fittings, Nozzles, Switches and Valves, nell & Miller, Chicago, Ill.
- M & S-Cork Insulation. Mitchell & Smith, Inc., Detroit.
- M-VB—Humidifier Fittings, Valves. Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
- Macheta—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.
- Mack-Heaters. J. V. Patten Co., Syca-
- Magic Weather—Air Conditioners, Blowers and Air Washers. Ballan-tyne Co., Omaha.
- Majestic-Roofing, Skylights, Ventila-tors, W. A. Fingles, Inc., Baltimore, Md.
- anco—Fan Blades. Manker Products Co., Inc., Memphis.
- Manganweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Mark Time—Time Switches. I Rhodes, Inc., Hartford, Conn. M. H. Mars Furnaces. Pacific Gas Heating
- Co., San Francisco. Marvel—Punches. Armstrong-Blum Mfg. Co., Chicago, Ill.
- Marvelaire-Furnaces. Essick Manufacturing Co., Los Angeles.
- Mascofil—Insulation. Munn and Steele, Inc., Newark, N. J.

Massachusetts—Blowers, Fans. Bish. & Babcock Mfg. Co., Cleveland, O.

Master—Controls, Motors, Thermostats. White Mfg. Co., St. Paul, Minn.

Master—Air Conditioning Furnaces.
Premier Furnace Co., Dowagiac, Mich.

hter—Hangers and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Master-Stokers. Muncie Gear Works, Inc., Muncie, Ind.

Master Kraft-Furnaces, Coils, Oil Burners, Regulators and Heat Savers. Harvey-Whipple, Inc., Springfield, Mass.

Master Line—Soldering Torches. Turner Brass Works, Sycamore, Ill. Mastr-Lok—Pipe Fittings. Parkersburg Iron & Steel Co., Parkersburg, W.

Va.

Wax-i-min—Furnaces. The Gehri Co.,
Tacoma, Wash.

Mayari B-Nickel-Chromium Bethlehem Steel Co., Bethlehem, Pa.

Mayflower—Refrigerating Compressors. Hardy Mfg. Co., Dayton, O.

Mayn Air—Stack Head Damper. Con-trolair, Inc., Elyria, Ohio. McIlvaine-Oil Burners, Landwehr Heat-

ing Corp., Philadelphia, Pa.

Meco—Gas Welding Rod, Torches. Mod-ern Engineering Co., St. Louis. Meco Jiffy—Soldering Torches. Modern Engineering Co., St. Louis.

Mellow-Furnaces. Front Rank Furnace Div., Liberty Foundry Co., St. Louis.

Mellow-Aire — Furnaces. Front Rank Furnace Div., Liberty Foundry Co., St. Louis.

Mel-Bock-Ventilators and Wa Mellish & Murray Co., Chicago.

Mercury-Soldering Coppers. Electric Co., Lynn, Mass.

Metalace-Registers. American Foundry & Furnace Co., Bloomington, Ill.

Metalbestos—Pipe and Fittings. Williams-Wallace Co., San Francisco.

Metallite-Paint. Glidden Company, Cleveland.

Metal Master—Snips and Shears. Wiss & Sons Co., Newark, N. J.

Metrotherm-Thermostats. General Controls Co., Glendale, Cal.

Meyco-Furnaces. Meyer Furnace Co., Peoria, Ill.
rostat Thermostats. Julien P. Friez

& Sons, Baltimore.

Micro-Weld-Spot Welders. Micro Products Co., Chicago.

Midget—Bending Brake. A. R. Harris, Hammond, Ind.

Midget—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

Midget Kooler-aire — Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis.

Mighty Midget—Furnaces. Dowagiac Steel Furnace Company., Dowagiac,

Miles—Blowers. Henry Furnace & Foundry Co., Cleveland.

Miles, Jr.—Propeller B Henry Furnace & Cleveland, O. Furnace Fans. Foundry Co.,

Milwaukee-Ventilators. Milcor Steel Co., Milwaukee, Wis.

Minnemeyer—Fittings. LaCrosse Steel Roofing & Corrugating Co., La-Crosse, Wis.

nte—Damper Regulator Sets. Joal Mfg. Corp., Toledo.

Miracle-Air-Window Ventilators. Ad-Lee Co., Inc., Chicago.

Mistoil—Oil Burners. Wayne Oil Burner Corp., Fort Wayne, Ind. Automatic

Mistolator — Oil Burners, Burner Corp., Chicago, Ill.

Mobilaire—Room Air Conditioning Unit. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Model-Furnaces, Heaters. Home Stove Co., Indianapolis, Ind.

Moderator — Air Conditioning Unit Clarage Fan Co. Kalamazoo, Mich.

Modernair—Blower-Filter Units. Payne Furnace & Supply Co., Beverly Hills,

Modernaire—Heaters. Globe Machine & Stamping Co., Cleveland.

ModernAire—Air Conditioning Units, Fans. Dallas Eng. Co., Inc., Dallas, Tex.

ModernAire—Warm Air Furnaces and Repairs. Des Moines Stove Repair Co., Des Moines, Iowa.

Modern-Aire—Furnaces, Blowers. A cola Furnace Co., Gadsden, Ala.

Moderne—Blowers, Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

Modernistic—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala. Moditherm — Air Conditioning Units Clarage Fan Co., Kalamazoo, Mich.

Modutrol—Damper Duct Motors. Min-neapolis-Honeywell Regulator Co., neapolis-mon Minneapolis.

Moistair-Furnaces. Round Oak Co., Dowagiac, Mich.

Moler—Insulation. F. L. Smidth & Co., New York City.

Monarch—Furnaces. Forest City Foun-dries Co., Cleveland.

Moncrief-Blower-Filters, Prefabricated Ducts, Pipe Fittings and Accessories,
Furnaces, Heaters. Henry Furnace
& Foundry Co., Cleveland, O.

Monel—Sheets. International Nickel
Co., Inc., New York City.

Monitor-Furnaces. Marshall Furnace Co., Marshall, Mich.

Monmouth Plotrol—Humidifier Valves.

Monmouth Products Co., Cleveland.

Monmouth Humidigrad — Humidifier

Walves. Monmouth Products Co., Cleveland.

Monmouth Micro-Feed — Humidifier Valves. Monmouth Products Co., Cleveland.

Morning Air-Furnaces. Jac Metal Wks., Ogden, Utah. Jackson Sheet

Moto-Heat—Oil Burners. Brigham Oil Burner Co., St. Louis, Mo. Motopump—Water Circulating Pumps. Yeomans Bros. Co., Chicago.

oturb—Ventilators, U Co., Cliftondale, Mass. Mototurb-Uno Ventilator

Muelleraire—Air Conditioning Units. L. J. Mueller Furnace Co., Milwaukee,

Mule-Ride-Caulking Compounds, Paint and Roofing. Lehon Company, Chicago.

-Collectors. Research Corp., New York, N. Y.

Multi-Panel—Filters. American ter Co., Inc., Louisville, Ky. American Air Fil-

Multitherm—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

Multi-V-Filters. Staynew Filter Corp., Rochester, N. Y.

Multivane—Blowers. B. F. Sturtevant Co., Hyde Park, Boston.

Multi-Vane-Ventilators. Allen Corp., Detroit.

Arc Welding Electrodes. Mei & Thermit Corp., New York City.

M/W and A/C-Filters. American Air Filter Co., Inc., Louisville, Ky.

Mairoil—Oil Burners. National Airoil Burner Co., Philadelphia, Pa.

Mational—Blowers, Furnaces and Washers. P. H. MaGirl Foundry & Furnace Wks., Bloomington, Ill.

Mational—Furnaces, Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill. Matroco—Paint. National Tonawanda, N. Y. National Mfg. Corp.,

Welson—Stokers. Heating Assurance, Spokane, Wash.

Nesbit—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.

Nev-A-Bust—Protective Metal Coatings. Glidden Company, Cleveland.

Never Slip — Conductor Fittings. La-Crosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

American—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.

Newark-Furnaces. May-Fiebeger Co., Newark, Ohio.

New Departure-Aldrich Company, Wyoming, Ill.

Newmanco—Kalamein Doors, Grilles, Registers, Newman Brothers, Inc., Cincinnati, O.

Niagara—Furnaces. Forest dries Co., Cleveland, O. Forest City Foun-

Witeair—Night Air Cooling Fans. Lau Blower Co., Dayton, Ohio. Woel—Arc Welders. The Ideal Electric & Mfg. Co., Mansfield, O.

Non-Con-Dux — Cement, Insulation, Paper, Paste. Grant Wilson, Inc.,

Chicago, Ill. \*\*Monoize—Blowers. American Foundry & Furnace Co., Bloomington, Ill.

Non-Syphoning—Steel Roofing. Milcor Steel Co., Milwaukee.

Norblo-Blowers, Collectors, and Air Washers. Northern Blower Co., Washers. Nort Cleveland, Ohio.

Morfolk—Blower-Filters, Furnaces, Heaters, Humidifiers. Sloux City Foundry and Boiler Co., Sloux City.

Morthland-Heaters. J. V. Patten Co., Sycamore, Ill.

Nor'wester-Blowers. Grand Rapids Die & Tool Co., Grand Rapids, Mich.

Norwol-Insulation. Norristown Mag-nesia & Asbestos Co., Norristown, Pa.

-Register Shields. Craft Co., Terre Haute, Ind.

No-Streak-Registers, Rock Island Register Co., Rock Island, Ill.

Novoid—Aluminum Paint. Bases, Insulation. Cork Import Corp., New York, N. Y.

Mu-Air—Air Conditioning Units. American Metal Products, Fort Worth, Tex.

Nu-Air—Blades and Fans. Meier Electric & Machine Co., Indianapolis, Ind.

Nu-Air-Ventilators. Milcor Steel Co., Milwaukee, Wis.

Mu-Alpina—Gravity Roof Ventilators.
Milcor Steel Co., Milwaukee, Wis.

Nu-Dry-Furnace Cement, Pyrolite Products Co., Cleveland, O.

Nu-Grip—Snips and Shears. J. Wiss & Sons Co., Newark, N. J.

Nu-Notch—Ventilators. Knowles Mush-room Ventilator Co., Montclair, room N. J. Montclair.

Muroof-Roof Cement. Acorn Refining Co., Cleveland,

Nu-Steel-Metal Cleaner. Pynosol Laboratories, Inc., Chicago.

Nussbaum—Furnaces. American Standard Gas Products Co., Detroit.

Musurface-Hot Surface Paint. Acorn Refining Co., Cleveland.

Nutipe—Gas Conversion Burners. Co-lumbia Burner Company, Toledo. Nu-Wood—Rigid Insulation. Wood Con-

version Co., St. Paul.

#### 0

-Conductor Pipe Strainers. U. S. Cistern Filter Mfg. Co., Bloomington, Ill.

P.—Stokers and Stoker-fired Furnaces. Pocahontas Fuel Company Incorporated, Cleveland.

"Odorsorber".—Odor Adsorbers. Dorex Air Conditioning Div., W. B. Connor Eng. Corp., New York City.

Ohio Lock—Furnace Pipe. R & Mfg. Co., Dover, Ohio. Reeves Steel

Oil Chief-Furnaces. Dowagiac Furnace Company, Dowagiac, Mich.

Oil-Economy — Oil-Burning Air-Conditioning Furnace. International Heater Co., Utica, N. Y.

oil-Eighty-Boiler Burner Unit. Fitz-gibbons Boiler Co., Inc., New York.

Oil "Pire" Conditioner-Furnaces. Pherson Furnace & Supply Co., Port-

Oilfire Monogram—Furnaces. Q Stove Mfg. Co., Quincy, Ill. Quincy

-Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Oil Master-Furnaces. Round Oak Co., Dowagiac, Mich.

Master Airklenzer—Air Conditioning Furnace. Round Oak Co., Dowagiac, Oil Master Airklenzer-Mich.

Oil-n-Aire—Oil Burners. Aldrich Co., Wyoming, Ill.

Oil-O-Matio-Oil Burners. Williams Oil-O-Matic Heating Corp., Bloomingington, Ill. Faithful—H

-Humidifiers. Maid-O'-Mist, Inc., Chicago.

Olympic-Furnaces. Washington Stove Works, Everett, Wash.

n Dome—Furnaces. American Furnace & Foundry Co., Milan, Mich. Open Dome-

Orsatomat-Flue Gas Analyzer. Hays Corp., Michigan City, Ind.

Oshkosh-Stokers. Leach Co., Oshkosh,

Outowall—Registers. Rock Island Register Co., Rock Island, Ill.

Ovaltube-Gas Burners, Beck Engineering Combustion Kompany, St. Louis

Oxweld—Welding Apparatus. Linde Air Products Co., New York, N. Y.

Ozite—Insulation.
Felt Co., Chicago. American Hair &

P-G-R—Air Conditioning Units, Blower-Filters, Blowers, Pipe Fittings and Accessories, Registers and Valves. Pacific Gas Radiator Co., Hunting-ton Park, Cal.

P. & H. Hansen—Arc Welders. Ha nischfeger Corp., Milwaukee, Wis.

& B-Air Conditioning Units, Furnaces and Pumps. Pernot & Rich, Los Angeles. Pacifelt

ifelt—Insulation. Pacific States Felt & Mfg. Co., Inc., San Francisco. Pacific-Furnaces. W. W. Rosebraugh

Co., Salem, Ore. Pryne & Co.,

A.

rn

0-

n-

g-

IT-

ny

ex

Pacific Breeze—Fans. Pr Inc., Los Angeles, Cal. Pacific-Everlast-Furnaces. Pacific Gas

Radiator Co., Huntington Park, Cal. Pacific Thermolator—Circulating Heaters. Pacific Gas Radiator Co., Hun-

tington Park, Cal.

Packingless — Pumps. Chandler Co., Cedar Rapids, Ia.

Paintgrip—Sheets, American Mill Co., Middletown, Ohio. American Rolling

insul—Insulation. Refractory & sulation Corp., New York City.

Palco Wool-Insulation. Pacific Lumber Co., San Francisco, Cal. -Refrigerating and Air Conditioning Compressors. Modern Equip-

ment Corp., Defiance, Ohio. Paramount — Flashing. Flemm Lead Company, Inc., Long Island City, N. Y.

Paramount—Flashings. Rochester Lead Works, Inc., Rochester, N. Y.

willis Mfg. Co., Galesburg, Ill. Windows.

Parco-Skylight Lifts. Park City Cornice Works, Inc., Bridgeport, Conn.

Par-Exc-Oil Furnaces. Interstate Metal Products Co., Inc., Chicago.

Parkspray—Humidistats and Hygro-meters. Parks-Cramer Co., Fitchburg. Mass.

Patterson—Roofing Clips. America Sheet Metal Works, New Orleans. American

ble—Grilles. American Foundry & Furnace Co., Bloomington, Ill.

Pebble-Registers. Auer Register Co., Cleveland, O.

Peerless-Blowers, Cullectors, Washers. New York Blower Co., Chicago, Ill.

fless—Eaves Trough Hangers. Ab-bott Mfg. Co., Painesville, O. Penn-Aire-Furnaces. Union Mfg. Co.,

Boyertown, Pa. Penngun-Water Heaters. Penn Boiler

& Burner Mfg. Corp., Lancaster, Pa. Penn-Mont-Slate. Structural Slate Co., Pen Argyl, Pa.

- Controls. Penn Electric Switch Co., Goshen, Ind.

Perfect—Furnaces, Humidifiers. Ric ardson & Boynton Co., New York.

Perfect-Pit — Metal Ceilings, Milcor Steel Co., Milwaukee, Wis. Perfection-Eaves Trough Fittings and

Accessories. Iwan Brothers, South Bend, Ind.

Perfection—Mineral Wool Insulation. Riverton Lime & Stone Co., Inc., Riverton, Va.

Perfect-Lap Two-Drain—Steel R Milcor Steel Co., Milwaukee. -Steel Roofing.

Permat—Filters. Davies Corp., New York City. Davies Air Filter

Perry-Damper Clips and Tips. Griswold Mfg. Co., Erie, Pa.

Oil Burners. Aldrich Co., Wyoming, Ill. Petro-Oil Burners. Petroleum Heat &

Power Co., Stamford, Conn.

Pexto-Metal Workers' Machines and Tools. Peck, Stow & Wilcox Co., Southington, Conn. Pioneer-Oil Burners.

Scott-Newcomb. Inc., St. Louis, Mo.

Planeweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

Plaster Bond-Compounds. Barrett Co., New York City.

Plastic-Calk—Caulking Compounds.

Metal Weather Strip Co., Inc., Detroit.

Elastigum-Cement. Barrett Co., New York City.

Plastic PB-Cement. Barrett Co., New York City.

Plastiklast-Roof Cement and Waterproofing Compound. Acorn Refining Co., Cleveland.

stiken—Glazing Compounds. B. F. Goodrich Co., Akron, O.

Plastoid—Compounds, Furnace Cement. Plastic Products Co., Detroit, Mich.

Foundry Co., Inc., Indianapolis, Ind.

Plexiform-Blowers. Bayley Blower Co.,

Milwaukee, Wis. Pliavane—Grilles and Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.

Plinamel-Waterproofing Paint. den Company, Cleveland.

Pluramelt-Stainless Clad Sheets. gheny Ludlum Steel Corp., Brackenridge, Pa.

Plymco-Air Filters. Anderson ucts, Inc., Cambridge, Mass. Anderson Prod-

Plymco-Air Filters. Plymouth Cordage Co., North Plymouth, Mass.

dr—Air Conditioning Units. Fernot and Rich, Inc., Los Angeles. Polar Giant—Air Conditioning Units. Giant Manufacturing Co., Council

Bluffs, Iowa. Porcelite—Tile. Columbian Enameling & Stamping Co., Inc., Terre Haute, Portage-Furnaces. XXth Century Heating & Ventilating Co., Akron, O

Positive Arc—Arc Welders.
Apparatus Co., Chicago, Ill.

"Power-Plex"-Stokers. Link Belt Co., Chicago.

Powerstat-Valves. Mercold Corp., Chicago.

Precipitron—Automatic Air Filter. Westinghouse Electric & Manufac-turing Co., Cleveland.

Premier—Welding Rod. American Steel & Wire Co., Chicago, Ill.

Premier—Furnace Vacuum Cleaner. Electric Vacuum Cleaner Co., Inc., Cleveland, O.

Premier—Circulating Heaters. Kleen-Heet, Inc., Chicago.

Premier Sheets. Ree Co., Dover, Ohio. Reeves Steel & Mfg.

Premier Automatik-Stoker-Fired Air Conditioning Furnaces. Pr Furnace Co., Dowagiac, Mich.

Premier DeLuxe—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Premier Master-Furnaces. Premier Furnace Co., Dowagiac, Mich.

Presstico—Furnace and Roof Cement, Compounds, Paint. Presstite Engi-neering Co., St. Louis.

Presteel—Metal Stampings. Worcester Pressed Steel Co., Worcester, Mass. Worcester

Presteel—Fan Housings. Commercial Shearing & Stamping Co., Youngs-Commercial town, Ohio.

Prest-O-Lite-Soldering Coppers, Soldering Torches, Welding Equipment. Linde Air Products Co., New York,

-Oxy-Acetylene We Prest-O-Weld-Welding Equipment, Torches. Linde Products Co., New York, N. Y.

Princo — Hygrometers, Psychrometers, Electric Relays, Thermometers and Thermostats. Precision Thermomeand Instrument Co., Philadelphia.

Protection — Soldering Furnaces and Torches. Clayton & Lambert Mfg. Co., Detroit, Mich.

Protectomotor—Filters. Staynew Filter Corp., Rochester, N. Y.

Protector-Snow Guards. David Levow, New York City.

Protectorelay—Electric Relays. Mapolis-Honeywell Regulator Minneapolis.

Protectovent-Window Ventilator and Filter Units. Staynew Filter Corp., Rochester, N. Y.

Protex-Protective Coating for Metal. Haydn F. White & Co., Cleveland.

Pul-Air-Ventilators. Penn Ventilating Co., Philadelphia.

Pulversone-Stokers. American Coal Burner Co., Chicago, Ill.

Punkah-Louvres. Kelvin-White Co., Boston.

Purox—Oxy-Acetylene Welding Equip-ment and Torches. Linde Air Prod-ucts Co., New York, N. Y.

Pyralux-Enamels and Lacquers. E. du Pont de Nemours & Co., Wil-mington, Del.

Pyrobar—Roofing Tile. United States Gypsum Co., Chicago.

Q-T Ductliner-Celotex Corp., Chicago. Quaker Burnoil-Oil Burners, Furnaces and Heaters. Quaker Mfg. Co., Chicago.

ther City—Eaves Trough and Gut-ters, Conductor Fittings and Acces-sories, Pipe, Ridge Rolls and Ridg-ing. Berger Brothers Company, Quaker City-Philadelphia.

Quick Cleaner—Furnace Brushes. Pilley Packing & Flue Brush Mfg. Co., Fort Madison, Ia.

- Quick Heat—A. C. Furnace. American Stove Co., Lorain, O.
- Quiet May—Air Conditioning Furnaces, Units, Oil Burners. May Oil Burner Corp., Baltimore, Md.
- "Quilt"—Insulation. Samuel Cabot, Inc., Boston.

#### R

- & G—Grilles, Registers, Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- B & M Fans, Motors. Robbins & Myers, Inc., Springfield, O.
- R.M.O.—Burners. Rotary Mfg. Co., Los Angeles, Cal.
- RPM—Roofing Steel. H. H. Robertson Co., Pittsburgh.
- R-R-M Hygrometers, Psychrometers. The Palmer Co., Cincinnati.
- R-U-F-Fans and Ventilators. Reed Unit-Fans, Inc., New Orleans, La.
- Bace—Air Conditioning Units and Gas Furnaces. Royal Air Conditioning Equipment, Alhambra, Cal.
- Badi-Ion—Ozone Apparatus. Montgomery Brothers, San Francisco.
- Radolite—Insulating Cement and Refactories. Pyrolite Products Co., Cleveland, Ohio.
- Racine—Time Switches. Reliance Automatic Lighting Co., Racine, Wis.
- Radiant Heat—Baffles. Jones Products Company, Ferndale, Mich.
- Bainbow Mist—Nozzles. Peterson "Freezem" Mfg. Co., Kansas City, Mo.
- Ralpo-Sheet Metal Cutters. Ralph W. Poe, Canton, Ill.
- Ramco—Chimney Caps and Tops, Royal-Apex Mfg. Corp., Brooklyn.
- Rawl-Drive—Hardened Masonry Nails. Rawlplug Co., Inc., New York City.
- Raydant Heat—Stoker Baffles. Calesco Corporation, Lynn, Mass.
- Readyweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.
- Recoy—Air Conditioning Units and Coils. Refrigeration Economics Co., Inc., Canton, O.
- Red Band-Motors. Howell Electric Motors Co., Howell, Mich.
- Red Devil—Furnace Cement. Pecors
  Paint Co., Philadelphia.
  Red Devil—Snips and Shears. Crescent
- Red Devil—Snips and Shears. Crescent Tool Co., Jamestown, N. Y. Redi—Stokers. General Machinery Co.,
- Bedi-Stokers. General Machinery Co., Spokane, Wash. Bedi-Wail—Eaves Trough Hangers. Ab-
- bott Mfg. Co., Painesville, O.

  Red Metallic—Roofing Paint. Clinton
  Metallic Paint Co., Clinton, N. Y.
- Redox—Paint. Thompson & Co., Pittsburgh, Pa.
- Red-Reading Mercury Hygrometers, Psychrometers, and Thermometers. The Palmer Co., Cincinnati.
- Red Spindle—Dampers. Stover Mfg. & Engine Co., Freeport, Ill.
- Red Top-Insulation. United States Gypsum Co., Chicago, Ill.
- Red Top Thermostats. H-B Instrument Company, Philadelphia, Pa.
- Reed-Filters. American Air Filter Co., Inc., Louisville, Ky.
- Reflect-O-Cell Insulation. Aluminum Aircell Insulation Co., Detroit.
- Registair—Booster Fans. Kisco Company, Inc., St. Louis.
- Rego—Oxy-Acetylene Welding Equipment. Bastian-Blessing Co., Chicago, Ill.
- Reillaloy—Stove and Furnace Repairs.
  Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
- Renu-Filters. American Air Filter Co., Inc., Louisville, Ky.

- Republic—Gas Conversion Burners. Autogas Corp., Chicago, Ill.
- Republic-Taylor-Terne Roofing Plates.
  Republic Steel Corporation, Cleveland.
- Research (Walton)—Filters. Research Products Corp., Madison, Wis.
- Rex—Bearings, Pillow Blocks, Blower-Filter Units, Fans and Ventilators. Air Controls, Inc., Cleveland.
- Rex-Furnaces. Calkins & Pearce, Columbus, O.
- Rex-Spot Welders. Dyer Welder & Engineering Co., Kansas City, Mo.
- Rex-Airate—Fans, Ventilators. Air Controls, Inc., Cleveland, O.
- Rex-Air-Pak—Blower Units. Air Controls, Inc., Cleveland, O.
- Rexoil—Oil Burners, Furnaces. Reif-Rexoil, Inc., Buffalo, N. Y.
- Rex Vibra-Sorbers—Vibration Eliminating Metal Hose. Chicago Metal Hose Corporation, Maywood, Ill.
- Reynolds—Ducts and Duct Fittings.
  Richmond Radiator Co., Inc., Uniontown, Pa.
- Rezistal Stainless Steels. Crucible Steel Co. of America, New York.
- Ehino—Caulking and Glazing Compounds. Pecora Paint Co., Philadelphia.
- Bincon-trol—Enamels and Lacquers.
  Roxalin Flexible Lacquer Co., Elizabeth, N. J.
- Rip-o-Lin—Enamels. Glidden Company, Cleveland.
- Rip-pl—Enamels, Lacquers and Paints. Hilo Varnish Corp., Brooklyn.
- Edval—Copper and Zinc Straps. David Levow, New York, N. Y.
- Riverside—Furnaces. Rock Island Stove Co., Rock Island, Ill.
- Robinson—Brakes, Presses and Dies, Punches. New Albany Machine Mfg. Co., New Albany, Ind.
- Roche—Paint Spray Guns. Binks Mfg. Co., Chicago.
- Rocktex-Insulation. Philip Carey Co. Lockland, Cincinnati, O.
- Rohaco—Blowers, Pipe Fittings and Accessories, Furnaces, Grilles, Pipe, Registers, Heat Savers, Roberts-Hamilton Co., Minneapolis.
- Bollaire—Air Conditioning Furnaces. Hipoint Corp., Bellefontaine, O.
- Roofkoter—Paint. Tropical Paint & Oil Co., Cleveland, O.
- RoofSaver—Roofing Nails. Dickson Weatherproof Nail Co., Evanston, Ill.
- Rotex—Punches and Shears. M. Bollaert Oakland, Cal.
- Rotoblast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
- Boto-Clone—Dust Collectors. American Air Filter Co., Inc., Louisville, Ky.
- Botojet-Nozzles. Binks Mfg. Co., Chicago, Ill.
- Roxaprene—Enamels and Lacquers. Roxaline Flexible Lacquer Co., Inc., Elizabeth, N. J.
- Boyal—Caulking Compounds, Cement, Enamels, Lacquers, Waterproofing, Paint. A. Wilhelm Co., Reading, Pa.
- Royal—Furnaces. Hart & Crouse Corporation, Utica, N. Y.
- Royalastic—Roof Cement. A. Wilhelm Co., Reading, Pa.
- Royalbestos—Furnace Cement. A. Wilheim Co., Reading, Pa.
- Boyal Blue—Acid and Furnace Brushes. Schaefer Brush Mfg. Co., Milwaukee, Wis.
- Bubalt—Enamels, Lacquers and Paint.
  Alfred Hague & Co., Inc., Brooklyn,
  N. Y.
- Rubyfluid-Solder, Soldering Flux, Tinning Compounds. Ruby Chemical Co., Columbus, O.

- Budico-Furnaces. Rudy Furnace Co., Dowagiac, Mich.
- Rudisteel—Furnaces. Rudy Furnace Co., Dowagiac, Mich.
- Eusco-Insulation, Ventilators. Russell Co., F. C., Cleveland.

## S

- S-C-Furnaces. Surface Combustion Corp., Toledo, O.
- S-E-Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.
- SF-Soldering Coppers, Torches, Welders and Welding Equipment. Sight Feed Generator Co., Richmond, Ind.
- SF-Victor Torches, Oxy-Acetylene Welding Equipment. Sight Feed Generator Co., Richmond, Ind.
- S. L. S.—Cement. Barrett Co., New York City.
- S-L-Bar Folders, Nibblers, Slitting Machines. St. Louis Tool Co., St. Louis.
- S-M-Furnaces, Oil Burners. Scott-New-comb, Inc., St. Louis, Mo.
- Sachem—Circulating Heaters. Gilbert & Barker Mfg. Co., Springfield, Mass.
- Saf-ty-Mallets. Martin Bersted Co., Chicago, Ill.
- St. Louis—Stoker. Ormsby-Osterman Co., St. Louis.
- Salmo—Cement, Insulation, Pipe Coverings. Sall Mountain Co., Chicago, Ill.
- Samco—Cement. Standard Asbestos Mfg. Co., Chicago, Ill.
- Sampson—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.
- Sanidaire—Humidifiers. U. S. Air Conditioning Corp., Minneapolis, Minn.
- Satis-Fyre—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.
- Sauter-Time Switches. R. W. Cramer Co., Inc., Centerbrook, Conn.
- Sav-Haf-Oil Burners. Aldrich Co. Wyoming, Ill.
- Sav-T-Heat—Air Conditioning Furnaces. C. A. Dunham Co., Chicago, Ill.
- Schmidt—Soldering Coppers, Soldering and Brazing Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
- Scroll-Pivoter—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.
- Scruplex—Fans and Ventilators. L. J.
  Wing Mfg. Co., New York, N. Y.
  Seabreeze—Kitchen Exhaust Fan. Emerson Electric Mfg. Co., St. Louis,
  Mo.
- Mo.

  Seal-Erimp—Flashing, Ridge Rolls and Ridging. American Rolling Mill Co., Middletown, Ohio.
- Co., Middletown, Ohio.

  Seal-Less—Condensing Units. Westing-house Electric & Mfg. Co., East
- Springfield, Mass.

  Seal of Quality—Roofing. Columb'a Steel
  Co., San Francisco, Cal.
- Sealpruf—Waterproofing. General Insulating Products Co., Brooklyn.
- Seal-Tite—Roof Cement. C. Arthu Miller & Son, Elmira, N. Y
- Seamless—Furnaces, Watern an-Waterbury Co., Minneapolis, Minn. Security—Caulking and Roofing. National Mfg. Corp., Tonawanda, N. Y.
- Selectair—Air Conditioning Units and Oil Furnaces. S. T. Johnson Co., Oakland, Cal.
- Self-Cleaning-Furnaces. Moore Corp., Joliet, Ill.
- Selfvulc Waterproofing Compounds, Paint. Self-Vulcanizing Rubber Co., Inc., Chicago.
- Semco—Presses and Dies, Punches. Service Machine Co., Elizabeth, N. J. Sensatherm — Thermostats. Mercold Corp., Chicago.
- Sensitrol—Electrical Relays. Weston Electrical Instrument Corp., Newark, N. J.

70 Serviceman—Recording Thermostat. Jas. P. Marsh Corp., Chicago.

Shield-Arc—Electrodes and Welders Lincoln Electric Co., Cleveland, C

Shock Pads—Vibration Isolating Pads. B. T. Butterworth, Jr., New Canaan,

Shower-Proof-Paint. Calbar Paint & Varnish Co., Philadelphia, Pa.

Shur-Flux—Soldering Flux. McNamee Products, Glencoe, Ill.

Shur-Heat—Stokers, Air Conditioning & Stokers, Inc., St. Louis. Air Condi-Silent-Furnace Blowers.

tioning Equipment Co., Minneapolis. Silent Air—Fans and Blades, Belanger Fan & Blower Co., Detroit.

-Blowers, Filters. Gehri Co., Tacoma, Wash.

Silentaire—Window Ventilator and Fil-ter Units. Berger Mfg. Div., Repub-lic Steel Corp., Canton, Ohio.

Silent-Auburn—Oil Burners, Furnaces, Heaters. Auburn Burner Co., Au-burn, Ind.

Silentblu-Gas Burners. Beck Engineering Combustion Kompany, St. Louis. Silere—Fans. Aire-Foile Fan & Blower Company, Detroit, Mich.

v-

rt

an

er

ın.

Dil

er

68.

iss

J.

uis,

Aill

ast

teel

su-

hur

ter-

Na-

and Co.,

orp.,

Co.,

hes.

coid

ston

1941

Silver-Krome-Aluminum Paint. Ford Roofing Products Company, Chicago.

Silver-Seal—Aluminum Paint. Asphalt Products Co., Syracuse, N. Y. Simplex-Quadrants. Ohio Products Co.,

Cleveland. Simplex-Humidiflers. Henry Kraker,

Holland, Mich. Simplex-Humidiflers. Sallada Mfg. Co.,

Minneapolis, Minn. Simplex—Stoker. Stoker Products, Inc., Decatur, Ill.

Sim-trol—Smoke Pipe Draft Regulators. Simplex Mfg. Co., Fond du Lac, Wis.

Sirocco—Air Conditioning Units, Blow-ers, Fans, Washers, Wheels. Ameri-can Blower Corp., Detroit.

Slaters' Pelt-Insulation. Barrett Co., New York City.

Slumberette—Night Air Cooling Fan Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

othare—Are Welding Electrod Harnischfeger Corp., Milwaukee. Electrodes.

Snaplock—Furnace Pipe, Re-& Mfg. Co., Dover, Ohio. Reeves Steel

Snapon-Mouldings & Trim. John Lees Div., Serrick Corp., Muncie, Ind.

Sno-Brese-Air Conditioning Units. Palmer's Mfg. Corp., Phoenix, Ariz.

Snug-Fit—Coils. Hotstream Heater Co., Cleveland, O.

Softweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

Sol-Air-Floor Furnaces. Utility Fan Corporation, Los Angeles. Solid Comfort-May-Fiebeger Co., New-

ark. Ohio.

Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn. oco—Chimney Caps and Tops. South-bridge Roofing Co., Southbridge,

Spando - Waterproofing. Cheney Co., Philadelphia.

-Soldering Flux. Pfanstiehl Chemical Co., Waukegan, Ill.

Speed Clips—Spring Steel Fastenings. Tinnerman Products, Inc., Cleveland.

Spee Dee Coils. Air Controls, Inc., Cleveland, O.

-Dee-Heet-Furnace Blowers. Williamson Heater Co., Cincinnati.

Speed-heat—Furnaces. Marshall Furnace Co., Marshall, Mich.

Speed Nuts-Sheet Metal Nuts. Tinner-man Products, Inc., Cleveland.

Speed-Up-Concrete Waterproofling Cement. Hilo Varnish Corp., Brooklyn.

sphinx-Blower-Filter Units, Burners, Furnaces. C. L. Bryant Corp., Cleveland, O.

Sphinx, Jr.—Furnace Corp., Cleveland. -Furnaces. C. L. Bryant

Spinner-Ceiling Ventilators. Milcor Steel Co., Milwaukee.

Spiralaire Gun Type Oil Burner. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Spirodome—Spray Nozzles. Phillips Cooling Tower Co., Inc., New York

Spirovane—Ventilating Fans. Western Blower Co., Seattle, Wash.

Spra-Bite—Nozzles. Binks Mfg. Co., Chi-cago, Ill.

Spraymaker-Humidifiers. Lennox Furnace Co., Marshalltown, Iowa.

Stable-Arc — Arc Welding Electrodes, Arc Welders. Lincoln Electric Co., Cleveland, O.

Stack Heet-Heat Savers. Robert Barclay, Inc., Chicago.

Stainweld — Arc Welding Electrodes Lincoln Electric Co., Cleveland, O. Arc Welding Electrodes.

Stakool-Fans. Manker Products Company, Inc., Memphis. Sta-Lock-Prefabricated Ducts and Duct

Chicago Furnace Supply Co., Chicago.

Stamco—Furnace Pipe, Fittings. Cincinnati Stamping Co., Cincinnati, O.

Standard-Furnaces. Aladdin Heating Corp., Oakland, Cal.

Standard-Furnaces. Home Furnace Co., Holland, Mich.

Standard—Furnaces, Heaters. Fa Furnace Co., Springfield, Ill.

Standard-Ventilators. Allen Corp., Detroit.

Standard Topton—Furnaces. Klein Stove Co., Philadelphia.

-Furnaces. Arcweld Mfg. Co., Inc., Seattle, Wash.

Star-Solder. Eagle-Picher Lead Co., Cincinnati, O.

r—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O. Star-Ventilators. Merchant & Evans

Co., Philadelphia, Pa. Steelcore-Galvanized Steel Shingles Tennessee Coal, Iron & Railroad Co.,

Birmingham, Ala. Steel-Fin-Heating Coils. New York Blower Co., Chicago.

Steel Mixture-Baffles and Refractories.

McLeod & Henry Co., Inc., Troy, Sterling -Beading Machines. F. L. Rob-

ertson, Buffalo.

Stewart—Furnaces. Fuller-Warren Co., Milwaukee, Wis.

Stic-Tite—Cement and Insulation. & Insulation Corp., New York City.

Stokabilt-Air Conditioning Stoker Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

Stok-A-Timer-Stoker Controls. Mercoid Corp., Chicago.

Stoker Economy-Stoker Furnaces. International Heater Co., Utica, N. Y.

Stoker "Pire" Conditioner — Furnaces.
McPherson Furnace & Supply Co., Portland, Ore.

Stoker-Ola-Stokers. Advance Appliance Co., Peoria, Ill.

Stokerator-Domestic Stokers. Northern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Honey-well Regulator Co., Minneapolis.

Schwitzer-Cum-Stokol-Reat—Furnaces. mins Company, Indianapolis, Ind.

Stokol Hydraulic-Stokers. Schwitzer-Cummins Co., Indianapolis, Ind. Stokol Mercury — Stokers. Schwitzer-Cummins Co., Indianapolis, Ind. StormSeal—Roofing Steel. Columbia Steel Co., San Francisco, Cal.

Stowsway-Attic Furnaces. Lennox Furnace Co., Marshalltown, Ia.

-Eaves Trough and Gutters. Strate-Edge-Milcor Steel Co., Milwaukee

Streamaire--Air Conditioning Units and Coils. Young Radiator Co., Racine, Wis.

amline—Furnaces, A Corp., Oakland, Cal. Streamline Aladdin Heating

Streamline Heater-Furnaces. Thermal Engineering Associates, Chicago.

Summer Comfort-Attic Fans. Air Controls, Inc., Cleveland.

Sunbeam-Furnaces, Blower-Filters, Oil Burners, Heaters and Humidiflers. American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Sun Fuel-Miser—Furnaces and Heaters. J. V. Patten Co., Sycamore, Ill.

rise—Oil Burners. Works, Detroit, Mich. Kais Sunrise

Super—Hangers and Fittings. Roya Apex Mfg. Corp., Brooklyn, N. Y. Royal-

er — Roof Flashing. Eagle-Picher Lead Co., Cincinnati, O.

Superair - Blower-Filter Units. Majestic Co., Huntington, Ind.

Super Air Screws — Ventilating Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

erbrite—Aluminum Paint. Acorn Refining Co., Cleveland. Superbrite-

Superfex—Furnaces, Heaters, tion Stove Co., Cleveland. Heaters.

Superfin—Furnaces. American Fdry. & Furnace Co., Bloomington, Ill.

w. F. Hirschman Co., Inc., Buffalo. Super Firma

Superheat-Furnaces. Dallman Supply Co., Sacramento, Cal.

Super Reater—Heaters. Universal Util-ities, Crestline, Ohio.

Super-Quiet-Oil Burners. Green Conial Furnace Co., Des Moines, Ia. Green Colo-

Superior-Furnaces, Pacific Gas Radiator Co., Huntington Park, Cal.

Superior—Blowers, Filters, Ventilators. American Foundry & Furnace Co., Bloomington, Ill.

erior—Furnaces. Richardson & Boynton Co., New York, N. Y.

Superior—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

Super Red Streak — Furnace Vacuum Cleaners. National Super Service Cleaners. Nati Co., Toledo, O.

Super-Thermo-Stucco for refractory Maintenance (Refractory Lining Mix). Chicago Fire Brick Co., Chicago, Ill.

Super-X—Roofing Nails. Republic Steel Corporation, Cleveland.

Supreme—Furnaces. American Furnace & Foundry Co., Milan, Mich.

Supreme—Furnaces, Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Supreme Oil Conditioner—Furnaces. Mc-Pherson Furnace & Supply Co., Portland, Ore.

Suredrane — Roofing. Ree Mfg. Co., Dover, Ohio. Reeves Steel &

Mfg. Co., Dover, Ohio. Reeves Steel &

Surety—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

faceol — Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Sylphon—Damper Regulators, Thermostats and Valves. Fulton Sylphon stats and Valves. I Co., Knoxville, Tenn.

Surfaceweld-Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

Symentrex—Waterproofing Compounds.
A. C. Horn Co., Long Island City.

- Synchron—Stoker Controls, Relays, Switches. Industrial Engineering Switches. Corp., Evansville, Ind.
- SyncreTizer—School Room Heaters.
  John J. Nesbitt, Inc., Philadelphia.
- Symonds-Registers. Front Rank Furnace Div., Liberty Foundry Co., St.

#### T

- tafoo-Air Filters. Tuttle Air Filter Co., Inc., Louisville, Ky.
- Tag-Humidistats, Hygrometers, Thermometers, Thermostats and Gas Pressure Regulating Valves. C. J. Tagliabue Mfg. Co., Brooklyn.
- -Ventilators. Tiffin Art Metal Co., Tiffin, O.
- Tanco-Paint. Thompson & Co., Pittsburgh, Pa.
- Techni-vane—Duct Turning Vanes. Waterloo Register Co., Waterloo, Ia.
- Technotrol—Electric Clock Thermostat. White Mfg. Co., St. Paul, Minn.
- Tee Joint—Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee.
- Temco Furnaces. Tennessee Enamel Mfg. Co., Nashville, Tenn.
- Temlok—Insulation. Armstrong Cork Co., Lancaster, Pa.
- Temperator-Air Conditioning Units. C. A. Dunham Co., Chicago.
- Tempered-Aire—Furnaces. Gar Wood Industries, Inc., Detroit, Mich.
- mpOstaT—Thermostats. D. & M. Mfg. Co., Midland Park, N. J.
- Tempryte—Heat Insulating Windows. Truscon Steel Co., Youngstown, O.
- Temtrol Thermostats. Penn Electric Switch Co., Goshep, Ind.
- Tensulate—Insulation. Tennessee Products Corp., Nashville, Tenn.
- Texrope—V-Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- -Furnace Cement. The Armstrong Company, Detroit, Mich.
- "The Pacific"—Furnaces. W. W. Rose-braugh Co., Salem, Ore.
- Therma-Plo—Circulating Heaters. Utility Fan Corp., Los Angeles.
- Thermalfuel Furnaces. Beck Engineering Combustion Kompany, St.
- Thermidaire rmidaire — Air Conditioning Units. E. K. Campbell Heating Co., Kansas City, Mo.
- Thermix-Blow Pipe Collectors. Daniel Corporation, Port Chester,
- Furnaces for Stoker Firing. American Furnace Co., St. Louis.
- Thermo-Drip Humidifiers. Automatic Humidifier Co., Cedar Falls, Ia.
- Thermo-Plex—Registers. Middleton Mfg. & Sales Co., Minneapolis, Minn.
- Thermogas—Furnaces. Beck Engineering Combustion Kompany, St. Louis,
- Thermogrip—Soldering Coppers. Ideal Commutator Dresser Co., Sycamore, T11.
- Thermoil-Furnaces. Beck Engineering Combustion Kompany, St. Louis.
- Thermolator-Heaters. Pacific Gas Radiator Co., Huntington Park, Cal. Thermopane-Windows. Libbey-Owens-
- Ford Glass Co., Toledo, Ohio.
- Thermopaste—Plastic Fire Brick. Chicago Fire Brick Co., Chicago, Ill.
  Thermotite—Insulation. Coast Insulat-
- ing Corp., Los Angeles. Thermu-Drip — Humidifier. Auton Humidifier Co., Cedar Falls, Ia. Automatic
- Thor—Electric Buffers and Shears. In-dependent Pneumatic Tool Co., Chi-
- Thor-Spray Paint Guns. Binks Mfg. Co., Chicago.

- Thor Drill Champion Electric Drills.
  Independent Pneumatic Tool Co., Chicago.
- Thread-Forming Screws. Continental Screw Co., New Bedford, Mass.
- 370 Special Paints. Thompson & Co., Pittsburgh, Pa.
- Threplex Flashing. Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Thrift-Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
- Thriftsteel—Furnaces. Round Oak Co., Dowagiac, Mich.
- Throway—Filters. American Air Filter Co., Inc., Louisville, Ky. Tik Wheat—Pipe Covering Paste. Clark Stek-O Corp., Rochester, N. Y.
- Timercoid-Time Clock. Mercoid Corp., Chicago, Ill.
- Timerelay—Relays. Minneapolis-Honey-well Regulator Co., Minneapolis.
- Time-Saver—Damper Quadrants. Goese Mfg. Co., Milwaukee.
- Timetrol—Switches. Penn Electric Switch Co., Goshen, Ind.
- Tin Loy Tinning Compounds. E Picher Lead Co., Cincinnati, O.
- Tinol-Compounds and Soldering Flux. American Solder & Flux Co., Phila-
- Tinzit—Tinning Compounds. McNamee Products, Glencoe, Ill.
- Titelock—Fittings and Accessories for Conductor, Eaves Trough and Gutter, Furnace Pipe, Copper Roofing, Metal Shingles and Tile. Milcor Steel Co., Milwaukee.
- Seal—Caulking Compounds. Radiator Specialty Co., Charlotte, N. C. TiteSeal-
- Tobin Bronze—Plates and Welding Rod. American Brass Co., Waterbury, Waterbury,
- -Insulation. Barrett Co., New York City.
- Toncan-Plates, Ridge Rolls and Ridg ing, Roofing, Sheets. Republic Steel Corp., Cleveland, O.
- lweld—Arc Welding Electrodes. Lincoln Electric Co., Clevelond, O.
- Toridaire—Furnaces. Fraser and John-ston Co., San Francisco.
- Toridheet-Blower-Filters, Oil Burners, Furnaces and Regulators. Steel Products Corp., Cleveland, O.
- Torit—Soldering Torches. Blessing Co., Chicago. Bastian
- Tornado Furnace Vacuum Cleaners. Breuer Electric Mfg. Co., Chicago.
- Torpedo—Skylights. Milcor Steel Co., Milwaukee, Wis.
- Torrid-Soldering Furnaces and Torches. Geo. W. Diener Mfg. Co., Chicago.
- Torrid Zone-Furnaces. Lennox Fur-
- nace Co., Marshalltown, Ia. nsite—Pipe and Fittings. Manville, New York City.
- Trans-Lux Metallio-Enamels and Lac Hilo Varnish Corp., Brookquers.
- lyn, N. Y. Transweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.
- Triple Drain—Channel Roofing. Repub-lic Steel Corp., Cleveland, O.
- Triple Lock-Roofing Nails. The Deniston Co., Chicago.
- Triplex—Furnaces. Home Furnace Co., Holland, Mich.
- Tripl-ife—Furnaces. V. Co., Cincinnati, O. Williamson Heater
- Tripltrol-Controls. White Mfg. Co., St. Paul, Minn.
- Triumph—Furnaces. Joseph Capps, Inc., South Gate, Cal.
- -Furnaces and Stokers. Auburn Burner Co., Auburn, Ind.
- Tropic Breeze—Furnaces. Dalzen Manufacturing Co., Detroit.

- Tropico—Humidifiers. Roberts-Hamilton Co., Minneapolis, Minn.
- -Thermostatic Bi-Metals. General Plate Co., Attleboro, Mass.
- Tuffernell—Paint. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Tungar-Arc Welder. General Electric Co., Schenectady, N. Y.
- Turbo-Lift—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
- Turret-Water Circulating Pumps. Yeomans Bros. Co., Chicago.
- Twin Contact-Controls, Relays, Thermostats. Per waukee, Wis. Perfex Corporation, Mil-
- Twin Control-Oil Burners. Macrae, Inc., Brooklyn.
- Twin-Pyre-Oil Burner. Aldrich Co., Wyoming, Ill.
- Twin Zephyr—Humidifier. Maid-O'-Mist, Inc., Chicago, Ill.
- -Reflective Blanket Insulation. Specialty Converters, Inc., East Braintree, Mass.

- U.S.—Pipe Fittings, Grilles, and Registers. United States Register Co., Battle Creek, Mich.
- USG-Built-Up Roofing and Roof Cement. United States Gypsum Co., Chicago, Ill.
- -Roofing, Sheets. Carnegie-Illinois
- Steel Corp., Pitsburgh, Pa.

  U. S. S. Columbia—Roofing, Sheets. Columbia Steel Co., San Francisco.
- U-Loy-Sheets. Republic Steel Corp., Cleveland, O.
- UMCO-Furnaces. Union Manufacturing Co., Boyertown, Pa.
- Uniblade Blowers. Autovent Fan & Blower Co., Chicago, Ill.
- Unicool Air Conditioning Units and Washers. Betz Air Conditioning Corp., Kansas City, Mo.
   Uni-Fin—Grilles and Warm Air Registers. Barber-Colman Co., Rockford, Ill.
- Uni-fio--Duct Turning Vanes, Grilles and Registers. Barber-Colman Company, Rockford, Ill.
- Uniloy-Stainless Steel Sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.
- pack—Blowers. American Machi Products Co., Marshalltown, Iowa. Unipack-American Machine
- Unique—Gas Heaters. Palmer's Mfg. Corp., Phoenix, Ariz.
- Thishear Portable Electric Shears.
  Stanley Electric Tool Div., The
  Stanley Works, New Britain, Conn.
- Unisorb—Bases and Pads and Duct Insulation. Felters Co., Inc., Boston, Mass.
- Unitaire Air Conditioning Units for Stores. Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Uni-Therm-Air Cond. Furnace. Utility Fan Corp., Los Angeles.
- Universal—Air Filters. Hugo Mfg. Co., Duluth, Minn.
- Universal—Dial Damper, Parker-Kalon Corp., New York, N. Y.
- Unwid-Damper Quadrants. Parker-Kalon Corp., New York, N. Y. Upson-Rivets. Republic Steel Corp., Cleveland, O.
- usAIRco—Air Conditioning Units, Blowers and Blower-Filter Units, Fans, Grilles, Ventilators, Washers and Blower Wheels. U. S. Air Conditioning Corp., Minneapolis.
- UTA-AMS—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
  - Utilus—Kitchen Exhaust and Ventilat-ing Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

"V" Crimp—Roofing. V San Francisco, Cal. W. R. Ames Co.,

Vacalox—Damper Regulators. Regulator Co., Cleveland, O.

Vacu-Draft-Forced Draft Blowers. Muncie Gear Works, Inc., Muncie,

Valley Porge—Cement. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Vaporator-Humidifiers. Rudy Furnace Co., Dowagiac, Mich.

Torrington Mfg. Co., Varipitch-Fans. Torrington, Conn.

-Enamels. Ferro Enamel Corp., Cleveland.

Ves-Clip — Stainless Roof Fastening Clips, National Stainless Clip Cor-poration, New York City.

Veelos-Adjustable V-Belts. Manheim Mfg. & Belting Co., Manheim, Pa.

meter—Anemometers. Illinois Test-ing Laboratories, Inc., Chicago, Ill.

Venetian—Roofing Paint. Clinton Metal-lic Paint Co., Clinton, N. Y. Vent-A-Louver-Louvered Ventilator for

Attic or Basement. Air Cor Products, Inc., Muskegon, Mich.

Ventil-aire — Window Ventilator-Filter Units. Fairbanks, Morse & Co., Chicago.

tura—Fans, Ventilators. An Blower Corp., Detroit, Mich. American

Venturi-Flo-Air Diffusers, Ceiling Ven-Barber-Colman Company, Rockford, Ill.

Vernalloy-Furnace Metal. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Vernois—Furnaces and Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Vibracork—Bases. Lancaster, Pa. -Bases. Armstrong Cork Co.,

Victor—Blower-Filter Units, Furnaces, Humidifiers, Stokers. Hall-Neal Humidiflers, Stokers. Han-Furnace Co., Indianapolis, and.

Victoroil—Air Conditioning Furnaces.
Hall-Neal Furnace Co., Indianapolis,

Corp., Hartford, Conn. Caloroil Burner

Vigoraire-Furnaces. Marshall Furnace Co., Marshall, Mich.

ing—Furnaces. Familian Pipe & Supply Co., Los Angeles, Cal. Viking-Furnaces.

Visaflame—Oil Burner Controls. Mercoid Corp., Chicago, Ill.

Vitalaire-Portable Room Cooler. Cooling Appliance Corp., Morrison, Ill.

Vitozone--Ozone Apparatus. Kisco Co., Inc., St. Louis.

Vitroliner—Vent and Flue Pipe and Fittings. Condensation Engineering Fittings. Cond Corp., Chicago.

ano—Chimney Caps and Tops, Ventilators. Iwan Brothers, South Bend,

У

n

nd

Vortex-Furnace Vacuum Cleaners. F. Sturtevant Co., Hyde Park, Boston, Mass.

Vudor-Venetian Blinds. Hough Shade Corporation, Janesville, Wis.

Stokers. Susquehanna neering Co., Bloomsburg, Pa.

Vulcanite-Roofing, Roofing Cement and Certain-teed Products Corp., New York, N. Y.

Valcatex—Caulking and Glazing Com-pounds. A. C. Horn Co., Long Island pounds. A. City, N. Y.

co—V-type Belts and Pulleys. Gates Rubber Co., Denver, Colo.

Warco-Refractories. Walsh tories Corp., St. Louis, Mo. Walsh Refrac-

Ward Co., Inc., River Forest, Ill.

Warrior-Furnaces. Dowagiac Furnace Co., Dowagiac, Mich.

Waterbase—Furnaces, Heaters. Furnace Co., Springfield, Ill.

Water-Boy-Humidifier Valves and Fit-tings. Maid-O'-Mist, Inc., Chicago,

-Oil Burners, Pipe Fittings Waterbury and Accessories, Furnaces and Heaters. Waterman-Waterbury Co., Minneapolis, Minn.

Waterseal-Cement. Thompson & Co., Pittsburgh, Pa.

tertender—Humidifier Valve. J. L. Skuttle Co., Detroit, Mich. Watertender

Wearweld - Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Wearwell - Paint. Thompson & Co., Pittsburgh, Pa.

Weathermaker—Air Conditioning Units. Carrier Corp., Syracuse, N. Y.

Weathermaster-Air Conditioning Units, Boiler Type. Carrier Corp., Syracuse, N. Y.

Weather Master ther Master — Air Conditioning Units. U. S. Pressed Steel Prod-ucts Co., Kalamazoo, Mich.

Weather Master—Stokers. Kol-Master Corporation, Oregon, Ill.

Weatherwood-Insulation. United States Gypsum Co., Chicago, Ill.

Webster-Spray Nozzles and Air Washers. W. J. Strandwitz & Co., Inc., Camden, N. J.

Webster-Nesbitt -Air Conditioning Units. Was Warren Webster & Co., Cam-

-Belts and Pulleys. American Pulley Co., Philadelphia, Pa.

Weir-Air Conditioning Furnaces, Gravity Furnaces, Heaters, Humidifiers, Stokers. Meyer Furnace Co., Peoria,

sco—Skylight Lifts. H. Weiss & Co., New York, N. Y.

Weldite—Electrodes and Welding Rod. Chicago Steel & Wire Co., Chicago.

Weldon-Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Weld-o-trol—Spot Welders. Westing-house Electric & Mfg. Co., East Pittsburgh.

d-O-Tron—Arc Welders. Al mers Mfg. Co., Milwaukee. Weld-O-Tron-

Wellsville Savage-Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

sco-Furnaces. John Westwick & Son, Inc., Galena, Ill. Wesco-Furnaces.

-Utility Room Furnaces. west Stove Works, Portland, Ore, Wesco-Furnaces.

Woods-Evertz Stove Co., Springfield, Mo.

Westco-Pumps. Micro-Westco, Inc., Bettendorf, Ia. Western Fan — Roof Fan Ventilators. Western Engineering & Mfg. Co.,

Los Angeles. Western King-Furnaces. Independence Stove & Furnace Co., Independence,

Western Turbine—Gravity Roof Venti-lators. Western Engineering & Mfg. Co., Los Angeles. Whirlator-Oil Burners.

& Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Whitney-JENSEN-Power Brakes. Whitney Metal Tool Co., Rockford, Ill.

Wiechert-Furnaces, Heaters. St. Clair Foundry Corp., Centralia, Ill.

-Smoke Pipe and Fittings. Wildergloss-Wilder Mfg. Co., Niles, Ohio.

Air Reduction Wilson-Arc Welders. Sales Company, New York City.

Wilson—Furnace Brushes. Worcester Brush & Scraper Co., Worcester,

Winair-Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Wind Electric—Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Wind-O-Pan, Jr. — Window Ventilating Fan. Chelsea Fan & Blower Co., Fan. Chelsea Fan Inc., New York City.

Wind-O-Vane Jr.—Kitchen Exhaust Fans. B. F. Sturtevant Co., Hyde Fans. B. F. Park, Mass.

Windowstat-Condensation Control. Julien P. Friez & Sons, Baltimore

Winkler-Fans and Stokers. U. S. Ma-chine Corporation, Lebanon, Ind.

Winner-Registers. Auer Register Co., Cleveland, O.

nter-Chaser — Furnaces, Heaters. Campbell Heating Co., Des Moines, Ia. Winter-Chaser -

Winter King — Furnaces. McPherson Furnace & Supply Co., Portland,

-Grilles. Wickwire Spencer Steel Co., New York City.

co., Town Color Furnaces.

Co., Inc., Gadsden, Ala.

ardaire—Air Conditioning Units.

Certified Products Co., Toledo. Wizard-Furnaces.

Wolverine-Fans, Blades, Ventilators. Belanger Fan & Blower Co., Detroit.

Wolverine-Furnaces. Marshall Furnace Co., Marshall, Mich.

Roofing Products Co., Chicago.

# Х

-Metal Windows. Herrmann & Grace Co., Brooklyn, N. Y.

-Coils, Furnaces. Deshler Foundry & Machine Works, Deshler, O.

Xit-Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

## Y

Yager's-Flux. Alex R. Benson Co., Inc., Hudson, N. Y.

Yankee—Damper Clips and Tips. S. M. Howes Co., Charlestown, Boston.

Yoloy-Alloy Plates and Sheets. Youngstown Sheet & Tube Co., Youngstown, O.

YouBert-Collectors and Blow Pipe Fit-tings. Young & Bertke Co., Cincin-

Zeph-o-Cone—Air Diffusers. Register Co., Waterloo, Ia. Waterloo

Zeph-Oil-Ator—Air Conditioning Fur-naces. Century Engineering Corp., naces. Century E Cedar Rapids, Ia.

Zephyr-A. C. Stoker Furnace, Premier Furnace Co., Dowagiac, Mich.

Zephyr-aire—Fans. Gas City Glass Co., Gas City, Ind.

Zero-Furnace and Insulating Cement and Refractories. Standard Engineering Co., Detroit, Mich.

Zilloy-Zinc Roofing. New Jersey Zinc Co., New York City.

Zincgrip-Steel Sheets. American Rolling Mill Co., Middletown, O.

 Zincoat—Sheets. Tennessee Coal, Iro
 & Railroad Co., Birmingham, Ala.
 Zone King—A. C. Furnaces. Centur Century

Eng. Corp., Cedar Rapids, Ia. Zone Queen-Gravity Furnaces. Century Eng. Corp., Cedar Rapids, Ia.

Z-Ro King-Furnaces. Oakland Foundry Co., Belleville, Ill.

## Section of

# American Artisan

# 1941 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

Section 3—MANUFACTURERS' ADDRESSES

•A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, Ill.

A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, III.
Abbott Mfg. Co., Box 150, Painesville, O.
Accurate Mfg. Works, 2336-88 Milwaukee Ave., Chicago, III.
Accurate Metal Weather Strip Co., 216 E. 26th St., New York City.
Ace Engineering Co., 1735 W. 31st St., Chicago, III.
Acer & Whedon, Inc., Commercial St., Medina, N. Y.
Acme Asbestos Covering & Flooring Co., 222 Elizabeth St., Chicago

Chicago, Ill. • Acme Electric Welder Co., 5619 Pacific Blvd., Huntington

Acme Heating & Ventilating Co., 4224 S. Lowe Ave., Chicago, Ill. Acme Industries, Inc., Cor. Mechanic & Ganson Sts., Jack-

son. Mich. Acme Oil Burner Co., Inc., 210 Third Ave., S. W., Cedar

Rapids, Ia. Acme Refining Co., W. 56th & W&LE Ry., Cleveland, O. Acme Tin Plate & Roofing Supply Co., 3rd & Westmoreland Sts., Philadelphia, Pa.

Acorn Refining Co., 8001 Franklin Blvd., Cleveland, Ohio.

Adams Co., The, East 4th St. Ext., Dubuque, Ia.

Adams Mfg. Co., J. D., 217 S. Belmont Ave., Indianapolis, Ind.

Adelta Manufacturing Co., Ellsworth St. at 21st, Philadel-

phia.
Adjustable Bearing Plate Co., 11 Rutger St., St. Louis, Mo. Ad-Lee Co, Inc., 825 S. Wabash Ave., Chicago, Ill.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago, Ill.
Advance Appliance Co., 808-810 Washington St., Peoria, Ill.
Advance Electric Co., 1260 W. 2nd St., Los Angeles, Cal.
Advance Fan & Blower Co., 3423 Bagley, Detroit, Mich.
Advance Insulating Co., 714 Magee Bldg., Pittsburgh, Pa.
Advanced Refrigerating Systems Co., 33rd & Arch Sts.,
Philadelphia. Philadelphia.

Philadelphia.

Asolus Dickinson, 3332-52 S. Artesian Ave., Chicago, Ill.

Aerofin Corp., 410 S. Geddes St., Syracuse, N. Y.

Aerofin Burner Co., Inc., Park Ave. at 57th St., West New

York, N. J.

Aerovent Fan Co., 710 E. Ash St., Piqua, O.

Agnew Electric Co., Milford, Mich.

Agricola Furnace Co., Inc., North 12th St., Gadsden, Ala.

Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.

Air Conditioning Equip. Co., P. O. Box 1123, Minneapolis.

Air Conditioning Products Co., 1230 Eighteenth St., Detroit.

Air Conditioning & Stokers, Inc., 1610 Tower Grove Ave.,

St. Louis.

St. Louis.

• Air Control Products, Inc., Glade St. at Larch, Muskegon,

St. Louis.

Air Control Products, Inc., Glade St. at Larch, Muskegon, Mich.

Air Controls, Inc., 1937 W. 114th St., Cleveland, O. Air Devices, Inc., 17 E. 42nd St., New York City. Air Equipment Co., 2405 W. 44th St., Denver, Colo. Air Filter Engineering Co., 2236 S. Wabash Ave., Chicago. Aire-Folie Fan & Blower Co., 4737 W. Vernor Highway, Detroit, Mich.

AireOzone Corporation, 105 W. Madison St., Chicago. Airgard Manufacturing Co., 609 N. La Salle St., Chicago, Ill. Airmaster Corp., 4317 Ravenswood Ave., Chicago.

Air-Maze Corp., 5200 Harvard Ave., Cleveland, O.

Airmode Manufacturing Co., 325 W. Huron St., Chicago.

Air-O-Cli Burners and Heating Utilities, Inc., 449 Senator St., Brooklyn, N. Y.

Air-O-Cell Industries, Inc., 11616 Cloverdale Ave., Detroit. Air-O-Line Co., The, 2113 Griffin St., Dallas, Tex. Airox Company, 366 Madison Ave., New York City. Air Reduction Sales Co., 60 E. 42nd St., New York City. Air Stream Filter Corp., 2100 Washington Ave., St. Louis. Air & Refrigeration Corp., 11 W. 42nd St., New York City.

Airtemp Div. Chrysler Corp., Leo St., Dayton, Ohio. Airtherm Mfg. Co., 700 S. Spring Ave., St. Louis. Airwasher Corporation, 1122 N. Washington Ave., Lansing, Mich.

Ajax Flexible Coupling Co., Westfield, N. Y.

Mich.

Ajax Flexible Coupling Co., Westfield, N. Y.

Aladdin Heating Corp., 2222 San Pablo Ave., Oakland, Cal.

Albright Equipment Co., 405 Penn Ave., Pittsburgh.

Alco Manufacturing Co., 2619 Milam St., Houston, Tex.

Alco Valve Co., 2628 Big Bend Blvd., St. Louis, Mo.

Alden Manufacturing Co., Painesville, Ohio.

· Aldrich Co., Wyoming, Ill Aldrich Pump Co., Foot of Pine St., Allentown, Pa. Alfol Insulation Co., Inc., 155 E. 44th St., New York City. Allegheny Ludium Steel Corp., Brackenridge, Pa.
Allen Billmyre Corp., 136 Water St., South Norwalk, Conn.
Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.

Allen Corp., 9752 Erwin, Detroit, Mich.

Allied Heating & Air Conditioning Co., 14807 Condon Ave., Lawndale, Cal.

Allis-Chalmers Manufacturing Company, Milwaukee.
Allis Co., Louis, 427 E. Stewart St., Milwaukee, Wis.
Allmetal Weatherstrip Co., 229 W. Illinois St., Chicago, Ill.
Allred Manufacturing Company, Inc., 2154 N. Sherman Dr.,

Indianapolis, Ind. All States Roofers Equipment & Material Co., 2107 W. Lake St., Chicago, Ill. Alpha Metal & Rolling Mills, Inc., 373 Hudson Ave., Brook-

Alpha Metal & Rolling Mills, Inc., 373 Hudson Ave., Brooklyn, N. Y.
Alphil Spot Welding Co., 431 W. Broadway, New York City.
Alter-Arc Mfg. Co., 209 B St., Lawton, Okla.
Alter Company, Harry, 1728 S. Michigan Ave., Chicago.
Alton Mineral Wool Insulation Co., P. O. Box 268, Alton, Ill.
Aluminum Aircell Insulation Co., 415 Curtis Bldg., Detroit.
Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh.
Aluminum Goods Mfg. Co., Manitowoc, Wis.
American Aglie Corporation, 5806 Hough Ave., Cleveland.
American Air Conditioning Co., 2831 Thirteenth Ave., Minneapolis, Minn.
American Air Conditioning Corp., P. O. Box 29, Sebastopol, Cal.

American Air Filter Co., Inc., 113 Central Ave., Louisville,

Ky. American Barlock Co., Inc., 36-32 38th St., Long Island City, N. Y.

N. Y.
American Blower Corp., 6000 Russell St., Detroit, Mich.
American Brass Co., 414 Meadow St., Waterbury, Conn.
American Cabinet Hardware Corp., Rockford, Ill.
American Chain Division, American Chain & Cable Co.,
Inc., York, Pa.
American Coal Burner Co., 155 E. Superior St., Chicago, Ill.
American Coils, Inc., 25-27 Lexington St., Newark, N. J.
American Coolair Corp., 3604 Mayflower St., Jacksonville,
Fla.

American Coppercote, Inc., 189 Montague St., Brooklyn, N. Y. American Emblem Co., P. O. Box 116V, Utica, N. Y. American Engineering Co., Aramingo Ave. & Cumberland

St., Philadelphia.

American Flange & Mfg. Co., Inc., 1901 RCA Bldg., Radio City, New York City.

American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie,

Pa.

American Foundry Equipment Co., 619 Byrkit St., Mishawaka, Ind.

•American Foundry & Furnace Co., 915 E. Washington St., Bloomington, Ill.

American Furnace Co., 2719-31 Delmar Blvd., St. Louis, Mo. American Furnace & Foundry Co., Milan, Mich.

American Furnace Lighter Sales Company, 4541 Delmar Blvd., St. Louis.

American Hair & Felt Co., 222 N. Bank Dr., Chicago, Ill. American Humidaire Corp., 951 Cherry St., S. E., Grand Rapids, Mich.

American Hydrozone Co., Inc., 500 Garfield Ave., Jersey City,

American Instrument Co., Silver Spring, Md. American Insulator Corp., New Freedom, Pa. American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh, Pa. American Machine Products Co., 207-11 Market St., Mar-

shalltown, Ia. American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich. American Metal Hose Branch, American Brass Co., 67 Jew-

elry St., Waterbury, Conn.

• American Metal Products, 730 Hudgins St., Fort Worth,

Tex. American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids, Mich.

American Moistening Co., 260 W. Exchange St., Providence, R. I. dence, R. I.

American Nickeloid Co., 1505 Second St., Peru, Ill.

American Pulley Co., 4200 Wissahickon Ave., Philadelphia.

•American Radiator & Standard Sanitary Corp., 40 W. 40th

St., New York City, and P. O. Box 1226, Pittsburgh.

•American Rolling Mill Co., 703 Curtis St., Middletown, O.

American Screw Co., 21 Stevens St., Providence, R. I.

American Sheet Metal Works, 331 N. Alexander, New Orleans, La. American Solder & Flux Co., 4519 Wayne Ave., Philadelphia, Pa. American Standard Gas Products Co., 11720 Cloverdale American Standard Gas Froducts Co., 11120 Corotalla Ave., Detroit.

American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. American Stove Company, Lorain Div., Lorain, O. American Warming & Ventilating Co., 1017 Summit St., Toledo. O. American Welding & Engineering Corp., 514 N. 9th St., Milwaukee, Wis.

American Wood Register Co., Novelty & Walnut Sts., Plymouth, Ind.

American Zinc Products Co., Greencastle, Ind.

American Zinc Products Co., Greencastle, Ind.

American Zinc Products Co., Greencastle, Ind.

American Co., W. R., 150 Hooper St., San Francisco, Cal.

Amirton Co., 48 N. Central Ave., Elmsford, N. Y.

Anchor Stove and Range Co., Third & Culbertson, New Albany, Ind.

Anderson Corp., Bayport, Minn.

Anderson Mfg. Co., 511 3rd, Des Moines, Ia.

Anderson Products, Inc., 17 Tudor St., Cambridge, Mass.

Andes Range & Furnace Corp., 117 Evans St., Geneva, N. Y.

Andrews Heating Company, 117-199 Main St., S. E., Minneapolis. waukee, Wis. apolis. Andrews Lead Co., Inc., 30-48 Greenpoint Ave., Long Island City, N. Y. Anemostat Corporation of America, 10 East 39th St., New Anemostat Corporation of America, 10 East 39th St., New York City.

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, O. Annis Air Filters, 1515 Gardena Ave., Glendale, Cal. Anti-Corrosive Metal Products Co., Inc., P. O. Box 788, Albany, N. Y.

Antigo Building Supply Co., Antigo, Wis.

Apex Rotarex Corp., 1070 E. 152nd St., Cleveland, Ohio.

Apollo Metal Works, 66th Pl. & So. Oak Park Ave., Clearing Sta., Chicago.

Apollo Steel Co., 609-617 Warren Ave., Apollo, Pa. Arcos Corp., 401 N. Broad St., Philadelphia, Pa. Arcweld Mfg. Co., Inc., 3469 Third Ave. W., Seattle, Wash. Arex Co., 333 N. Michigan Ave., Chicago, Ill. Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago.

Armstrong Cork Co., 992 Concord St., Lancaster, Pa. Armstrong Furnace Co., 1649 Olentangy River Rd., Columbus, O.

Arrow-Hart & Hegeman Elect. Co., 103 Hawthorn St., bus, O.

Arrow-Hart & Hegeman Elect. Co., 103 Hawthorn St.,
Hartford, Conn. Asphalt Products Co., Eastwood Sta., Syracuse, N. Y. Associated Heater Parts Co., 3101 Wentworth Ave., Chicago. Associated Southern Industries, 1161 Union Ave., Memphis, Tenn.

Atcheson Glass Co., T. J., 955 Main St., Buffalo, N. Y.

Athey Co., 6035 W. 65th St., Chicago.

Atkins & Co., E. C., 1939 Dallas St., Indianapolis, Ind.

Atlantic Metal Hose Co, Inc., 123 W. 64th St., New York City.

Atlas Belt & Screw Co., 1130 Ivanhoe Rd., Cleveland, O.

Atlas Heating & Ventilating Co., Ltd., 557 4th St., San

Francisco, Cal.

Atlas Machine & Tool Co., 1721 N. E. Alberta St., Portland, Ore.
Atlas Valve Co., 282 South St., Newark, N. J.
Auburn Burner Company, Auburn, Ind.
Auburn Stoker Co., Auburn, Ind.
Auburn Stoker Co., 3608 Payne Ave., Cleveland, O.
Au-Temp-Co Corp., 1 Park Ave., New York City.
Autoforce Ventilating Systems, 244 Washington St., Boston.
Autogas Corporation, 2258 Diversey Ave., Chicago.
Auto-Heat Corporation, 311 W. 66th St., New York City.
Automatic Burner Corp., 1823 Carroll Ave., Chicago, Ill.
Automatic Gasflux Mfg. Co., 198 Wayne St., Mansfield, Ohio.
Automatic Humidifier Co., 19th & Main Sts., Cedar Falls, Ia.

•Automatic Products Co., 2450 N. 32nd St., Milwaukee, Wis.
Automatic Pump & Softener Corp., Reckford, Ill. Automatic Pump & Softener Corp., Rockford, Ill.
Automatic Stoker Corp., Indianapolis, Ind.
Automatic Stoker Corp., 2427 W. North Ave., Milwaukee, Wis.
Automatic Switch Co., 41 E. 11th St., New York City.
Automatic Temperature Control Co., Inc., 34 E. Logan St.,
Philadelphia.

Autovent Fan & Blower Co., 1807-19 N. Kostner Ave., Chicago, Ill.

Babcock & Wilcox Co., 85 Liberty St., New York City. Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa. Bache & Co., Semon, Greenwich & Morton Sts., New York City. Badger Mfg. Co., 106 N. Frances St., Madison, Wis. Badger Mfg. & Sales Co., 743 N. 4th St., Milwaukee, Wis. Baer Brothers, 438 W. 37th St., New York City. Bahnson Co., Reynolds Bldg., Winston-Salem, N. C.

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland, O.
Baker Furnace & Cleaner Mfg. Co., 2505 Albion St., Toledo, O.
Baker Ice Machine Co., Inc., 1509 Evans St., Omaha, Nebr.
Baldor Electric Co., 4358 Duncan Ave., St. Louis, Mo.
Baldwin-Hill Company, 527 Klagg Ave., Trenton, N. J.
Baliantyne Co., 219 N. 16th St., Omaha, Nebr.
Balloffett Dies & Nozzle Co., Inc., 45-51 Adams St., Guttenberg, N. J.
Banner Repair Parts Co., 103 E. Indianola Ave., Youngstown, Ohio.
Barber Asphalt Corporation, Barber, N. J.
Barber Co., Inc., 1600 Arch St., Philadelphia.
Barber-Colman Co., River & Loomis Sts., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland, O. Barber Gas Burner Co., River & Loomis Sts., Rocator, In.

Barclay, Inc., Robt., 128 N. Peoria St., Chicago, Ill.

Bard Mfg. Co., Evansport Road, Bryan, Ohio.

Bardes Range & Foundry Co., E. H., 2619 Colerain Ave.,

Cincinnati, O. Barium Stainless Steel Corp., 1502 Allen Ave., S. E., Canton, O.
Barland Weatherstrip Material Co., 5600 Curtis Ave., Cleveland, O.

Barnes Metal Products Co., 4425 W. 16th St., Chicago, Ill.
Barnes, W. O., 1297 Terminal Ave., Detroit.
Barnett Co., 40 Rector St., New York City.
Barrett Engineers, 1322 Warrensville Center Rd., Cleveland Heights, O.
Barry Furnace Co., 208 N. B. St., Hamilton, O.
Bartiett Hayward Co., 200 Scott St., Baltimore.
Bartiett Mfg. Co., 3003 E. Grand Blvd., Detroit, Mich.
Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bayer Co., A. J., Slauson & Santa Fe Aves., Los Angeles.
Bayley Blower Co., 1817 S. 66th St., Milwaukee, Wis.
Beacon-Morris Corp., 702 Beacon St., Boston, Mass.

Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport, Conn. land. O. Conn.

Bear Mfg. Co., Rock Island, Ill.

Bearing Co. of America, Lancaster, Pa.

Beatrice Steel Tank Mfg. Co., 700 S. 7th St., Beatrice, Nebr.

Beatry Machine & Mfg. Co., 932 150th St., Hammond, Ind.

Beck Engineering Combustion Kompany, 3033 Spruce St.,

St. Louis, Mo. Beck Engineering Combustion Kompany, 3033 Spruce St., St. Louis, Mo.

Beckett Engineering Co., R. W., Elyria, Ohio.

Beckley Perforating Co., 315 North Ave., Garwood, N. J.

Bedard Mfg. Co., 1647 Hennepin Ave., Minneapolis, Minn.

Belanger Fan & Blower Co., 1230 18th St., Detroit.

Belco Exhaust Fan Mfg. Co., 3810 Olive St., St. Louis.

Belifield Co., H., 435 N. Broad St., Philadelphia.

Bell & Gossett Co., 3000 Wallace St., Chicago, Ill.

Belmont Smelting & Refining Works, Inc., 341 Belmont Ave.,

Brooklyn, N. Y.

Bender Warrick Corp., 131 Pierce, Birmingham, Mich.

Benjamin Air Rifie Co., 1527 S. 8th St., St. Louis.

Benjamin Air Rifie Co., Des Plaines, Ill.

Bennett Company, 1109 Harney St., Omaha, Nebr.

Benson Co., Inc., Alex R., 1040 S. Bay Rd., Hudson, N. Y.

Berger Bros. Co., 229-237 Arch St., Philadelphia, Pa.

Berger Mfg. Div. of Republic Steel Corp., 1038 Belden Ave.,

N. E., Canton, O.

Bergstrom Mfg. Corp., Neenah, Wis.

Berns Specialty Company, 1015 W. Lake St., Chicago, Ill.

Berns Co., Inc., Otto, 280 Lyell Ave., Rochester, N. Y.

Berry, Jr., F. E. & Co., Inc., Spring St., Everett, Mass.

Berryman Oil Burner Co., 1304 Washington Blvd., Chicago.

Bersted Co., Martin, 341 N. Crawford Ave., Chicago.

Bertram Mfg. Co., 230 E. Ohio St., Chicago, Ill.

Betts Register Co., 2005 W. Oklahoma Ave., Milwaukee, Wis.

Bethlehem Foundry & Machine Co., Brodhead Ave. & Second St., Bethlehem, Pa.

Betz Air Conditioning Corp., 1820 Wyandotte, Kansas City,

Mo.

Betz Corp., 460 State St., Hammond, Ind. Betz Corp., 460 State St., Hammond, Ind. Beverly Throatless Shear Co., 3009 W. 110th Pl., Chicago. Bien Air Conditioning Company, 1620 N. Spring St., Los Angeles.

Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee, Wis.

Bignall Co., 621-623 Main St., Medina, N. Y.

Binkley Mfg. Co., Warrenton, Mo.

Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.

Birmingham Fan Mfg. Co., Birmingham, Ala.

Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland.

Bishop Humidifier Co., 3011 Dexter Blvd., Detroit, Mich.

Bitner Engineering Co., 18-32 E. 135th St., New York City.

Black & Decker Mfg. Co., Pennsylvania Ave., Towson, Md.

Blake & Johnson Co., Waterville, Conn.

Bliss Co., E. W., 1420 Hastings St., Toledo, O.

Blocksom & Company, East Fifth St., Michigan City, Ind.

Blood Brothers, Div. Standard Steel Spring Co., Allegan,

Mich.

Bluffton Mfg. Co., 433 W. Main Cross St., Findlay, O.

Blower Application Company, 918 N. Fourth St., Milwaukee.

Bodine Electric Co., 2272 W. Ohio St., Chicago, Ill.

Bogue Electric Co., 80 Glover Ave., Paterson, N. J.

Bohn Aluminum & Brass, Michigan Ave. & Shelby St., De-Angeles.

Bogue Electric Co., 30 Glover Ave., Paterson, N. J.
Bohn Aluminum & Brass, Michigan Ave. & Shelby St., Detroit, Mich.
Bollaert, M., 3936 Rhoda Ave., Oakland, Cal.
Bossert Company, Inc., 1002 Oswego St., Utica, N. Y.
Bostwick-Goodell Co., Norwalk, Ohio.

Boston Gear Wks., Inc., North Quincy, Mass.

Bovee Furnace Works, Waterloo, Iowa. Boyd & Co., Inc., Chas. P., Tasker & Water Sts., Philad & Co., In delphia, Pa.

delpnia, Pa.

Braden Engineering, Inc., 896 Elmwood Ave., Providence, R. I.

Braden Mfg. Co., 431 N. 14th St., Terre Haute, Ind.

Brasco Manufacturing Co., Harvey, Ill.

Brauer Supply Co., A. G., 2100 Washington Ave., St. Louis.

Bremil Mfg. Co., Box 1030, Erie, Pa.

Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago. Ill.

cago, Ill.
Bridesburg Foundry Co., Tacony & Duncan Sts., Philadelphia, Pa.

phia, Pa.

Bridgeport Brass Co., E. Main St., Bridgeport, Conn.

Bridgeport Chain & Mfg. Co., 964 Crescent Ave., Bridgeport, Conn.

Bridgeport Screw Co., Bridgeport, Conn.

Briggs Mfg. Co., 11631 Mack Ave., Detroit.

Briggs & Stratton, 2711 N. 13th St., Milwaukee.

Brigham Oil Burner Co., 3745 Forest Park Blvd., St. Louis.

Brillion Furnace Co., Brillion, Wis.

Bristol Co., Platts Bridge, Waterbury, Conn.

Brooklyn Metal Ceiling Co., 283-89 Greene Ave., Brooklyn N. Y. Brooklyn Met lyn, N. Y.

lyn, N. Y.

Bros Boiler & Mfg. Co., Wm., Nicollet Island, Minneapolis. Brown-Brockmeyer Co., Inc., 1098 Smithville Rd., Dayton, O. Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., 4443 Wayne Ave., Philadelphia.

Brownell Co., N. Findlay St., Dayton, O. Browning Mfg. Co., 1821 Brownile, Ky.

Brumme Mfg. Co., 314 S. Artesian Ave., Chicago, Ill. Brundage Co., 510 N. Park St., Kalamazoo, Mich. Brunner Mfg. Co., 1821 Broad St., Utica, N. Y.

Bryan Steam Corp., P. O. Box 337, Peru, Ind.

Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland, O. Bryant Heater Co., 17825 St. Clair Ave., Cleveland, O. Bubar, Hudson H., 15 Park Row, New York City.

Buckeye Portable Tool Co., 25 Apple St., Dayton, O. Buckeye Products Co., 7024 Vine St., Cincinnati, O. Buckeye Products Co., 7024 Vine St., Cincinnati, O. Buffalo Forge Co., 497 Broadway, Buffalo, N. Y.

Buffalo Pumps, Inc., 171 Mortimer St., Buffalo, N. Y.

Buffalo Pumps, Inc., 171 Mortimer St., Daytonee, R. I. Burdett Mfg. Co., 19 N. Sheldon St., Chicago, Ill.

Burgess Soldering Furnace Co., 292 E. Long St., Columbus, O.

Burke Electric Co., 1201 W. 12th St., Erie, Pa.

Burke Electric Co., 1201 W. 12th St., Erie, Pa. Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago. Burmester Gas Furnace Mfg. Co., 2117 Cuming St., Omaha,

Nebr. Nebr.
Burnham Boiler Corp., 1 Main St., Irvington, N. Y.
Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burnwell Corp., 1113 N. 20th St., Allentown, Pa.
Burt Mfg. Co., 301 Main St., Akron, Ohio.
Bush Mfg. Co., 100 Wellington St., Hartford, Conn.
Butler Street Fdry. & Iron Co., 3422 Normal Ave., Chicago.
Butterworth, Jr., B. T., Oak Street, New Canaan, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh, Pa.
Byers Flashing Sales Division, 23 North Aberdeen, Chicago.

Cabot, Inc., Samuel, 141 Milk St., Boston, Mass. Calbar Paint & Varnish Co., 2620 N. Martha St., Philadel-

caloar Faint & varnish Co., 2020 N. Martina St., Philadel-phia, Pa. Caldwell Co., W. E., 2120 Brook St., Louisville, Ky. Calesco Corporation, 300 Broad St., Lynn, Mass. California Cornice, Steel and Supply Corp., 1620 N. Spring St., Los Angeles, Cal.

California Wire Cloth Corp., 1001 22nd Ave., Oakland, Cal. Calkins & Pearce, 203-205 E. Long St., Columbus, O. Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn,

N. Y.
Caloroil Burner Corp., 1477 Park St., Hartford, Conn.
Campbell, Andrew C., Division of American Chain & Cable
Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.
Campbell Heating Co., P. O. Box \$33, Des Moines, Ia.
Campbell Heating Co., E. K., 2445 Charlotte St., Kansas
City, Mo.
Campbell Machine Co., 2845 Harriet Ave., Minneapolis.
Canatsey Electric Manufacturing Co., 620 Wyandotte, Kansas City, Mo.
Canton Steel Ceiling Mfg. Co., 2280 Winfield Way, S. E.,
Canton, O.
Canton Stoker Corp., 507 Andrews Pl., S. W., Canton, O.

Canton, O.
Canton Stoker Corp., 507 Andrews Pl., S. W., Canton, O.
Canvas Products Co., 1236 S. 7th St., St. Louis.

Capitol Furnace & Stove Repair, 523 E. Washington St., Indianapolis, Ind.
Capps, Joseph, Inc., 3200 Ardmore St., South Gate, Cal.
Carbide and Carbon Chemicals Corp., 20 E. 42nd St., New

Carbide and Carbon Chemicals Corp., 20 E. 42nd St., New York City.
Carbo-Oxygen Co., 221-223 Fourth Ave., Pittsburgh, Pa. Carbondale Division, Worthington Pump & Machinery Corp., Harrison, N. J.
Carey Co., Philip, Wayne Ave., Cincinnati, O.
Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R. Lima, O. Carney Rockwool Co., Mankato, Minn.
Carpenter & Co., Geo. B., 440 N. Wells St., Chicago

Carrier Corp., 302 S. Geddes St., Syracuse, N. Y. Carter Paint Co., 310 N. Main St., Liberty, Ind. Carty & Moore Eng. Co., 511 W. Larned St., Detroit. Carry Mfg. Co., Waupaca, Wis.

Cash Universal Register Co., Marshalltown, Iowa.

Celotex Corp., 919 N. Michigan Ave., Chicago, Ill.

Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St.,

Chicago. •Central Furnace & Stove Repair Co., 3937 Olive St., St.

Louis, Mo.
Central-West Machinery Co., 335 S. Western Ave., Chicago.
Central Wire & Iron Works, 621 E. Locust St., Des Moines,

Century Electric Co., 1806 Pine St., St. Louis, Mo.
Century Engineering Corp., Cedar Rapids, Ia.
Century Fan & Vent. Corp., 292 Locust Ave., New York City.
Certain-teed Products Corp., 100 E. 42nd St., New York City.
Certified Flexible Couplings, Inc., 122 E. 42nd St., New York

Certified Flexible Couplings, Inc., 122 E. 42nd St., New York City.
Certified Products Company, 2014 N. 14th St., Toledo.
Chace Co., W. M., 1606 Beard Ave., Detroit, Mich.
Chain Beit Co., 1644 W. Bruce St., Milwaukee.
Chain Products Co., 3910 Cooper Ave., Cleveland, O.
Chain Tape Venetian Blind Co., Rockford, Ill.
Chalmers Oil Burner Co., 1234 Central Ave., Minneapolis.
Chamberlin Metal Weather Strip Co., 1254 La Brosse, Detroit, Mich.
Champion Blower & Forge Co., Harrisburg Ave. & Charlotte St., Lancaster, Pa.

Champion Blower & Forge Co., Harrisburg Ave. & Charlotte St., Lancaster, Pa.

Champion Furnace Pipe Co., 918 S. Adams St., Peoria, Ill.

Champion Tool Co., 376 W. 41st Place, Los Angeles, Cal.

Chandler Co., 804 1st Ave., N. W., Cedar Rapids, Ia.

Chapman Clay Co., Zanesville, O.

Chapman Slate Co., 546 Main St., Bethlehem, Pa.

Char-Gale Mfg. Co., 3127 Hiawatha Ave., Minneapolis, Minn.

Chase Brass & Copper Co., Inc., 236 Grand St., Waterbury,

Conn.

Chase Brass & Copper Co., Inc., 236 Grand St., Waterbury, Conn.

Chelsea Fan & Blower Co., Inc., 370 W. 15th St., New York City.

Cheney Co., 1202 Architects Bldg., 17th & Sansom Sts., Philadelphia, Pa.

Chicago Filter Co., Joliet, Ill.

Chicago Filter Co., Joliet, Ill.

Chicago Beiting Co., 113 N. Green St., Chicago.

Chicago Beiting Co., 113 N. Green St., Chicago.

Chicago Beiting Co., 2520 W. Monroe St., Chicago.

Chicago Bries Brick Co., 126 S. Clinton St., Chicago.

Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago, Ill.

Chicago Furnace Supply Co., 1273 Clybourn Ave., Chicago.

Chicago Metal Hose Corp., 1300 S. 3rd Ave., Maywood, Ill.

Chicago Metal Hose Corp., 1300 S. 3rd Ave., Maywood, Ill.

Chicago Metal Hose Corp., 1300 S. 3rd Ave., Maywood, Ill.

Chicago Perforating Co., 2445 W. 24th Pl., Chicago, Ill.

Chicago Perforating Co., 2445 W. 24th Pl., Chicago, Ill.

Chicago Pump Co., 2336 Wolfram St., Chicago, Ill.

Chicago Rawhide Mfg. Co., 1312 Elston Ave., Chicago.

Chicago, Ill.

Chicago Steel & Wire Co., 103rd St. & Torrence Ave., Chicago, Ill.

Chicago Steel & Wire Co., 103rd St. & Torrence Ave., Chicago, Chicago Venetian Blind Co., 3917 S. Michigan Ave., Chicago.

Chicago Venetian Blind Co., 3917 S. Michigan Ave., Chicago.

Chicago Venetian Blind Co., 3917 S. Michigan Ave., Chicago.

Chicago Venetian Blind Co., 3917 S. Michigan Ave., Chicago.

Chicago Venetian Blind Co., The, 2684 Madison Rd., Cincinnati, O.

Cincinnati Mfg. Co., Gest & Evans Sts., Chcinnati, O.

cinati, O. Cincinnati Mfg. Co., Gest & Evans Sts., Cncinnati, O. Cincinnati Shaper Co., Hopple, Garrard & Elam, Cincinnati, O. Cincinnati Sheet Metal & Roofing Co., 230 E. Front St.,

Cincinnati, O. Cincinnati Stamping Co., 28-34 W. McMicken Ave., Cincinnati, O. Circulators & Devices Mfg. Corp., 100 Prince St., New York

Circulators & Devices Mfg. Corp., 100 Prince St., New York City.

Clarage Fan Co., North & Porter Sts., Kalamazoo, Mich. Clark Bros. Bolt Co., Milldale, Conn.
Clark Co., Henry N., 56-62 Union St., Boston.
Clark Controller Co., 1146 E. 152nd St., Cleveland, O. Clark Dust Control Company, 210 N. Mozart St., Chicago. Clark Jr., Electric Co., Jas., 600 Bergman St., Louisville, Ky. Clark Stek-O Corp., 1631 Dewey Ave., Rochester, N. Y. Clauss Shear Co., Fremont, O.
Clay Equipment Corp., Cedar Falls, Ia.
Clayton & Lambert Mfg. Co., 11111 French Rd., Detroit. Cleveland Brush Factory, Inc., 7115 Dearborn Ave., S. W., Cleveland, O.

Cleveland, O.
Cleveland Punch & Shear Works Co., E. 40th & St. Clair
Ave., Cleveland, O.
Cleveland Steel Products Corp., Toridheet Div., Madison at
W. 74th St., Cleveland.

W. 74th St., Cleveland.

Climatemaker Slide Rule Service, Box 904, Bloomington, Ill.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clough, A. W., 28 S. Broad St., Meriden, Conn.
Coast Insulating Corp., 634 S. Western Ave., Los Angeles.
Cocking, Geo. J., 1336 W. 5th St., Santa Ana, Cal.
Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse,
N. Y.

•Cole Hot Blast Manufacturing Co., 3108 W. 51st St., Chi-

· Cole-Sullivan Engineering Company, 1316 Third St., North, Minneapolis, Minn.

Coleman Lamp & Stove Co., 2nd & St. Francis, Wichita,

Kan.

Colonial Alloys Company, Sheet & Tube Div., 2154 E. Somerset St., Philadelphia.

Columbia Burner Co., 729 Ewing St., Toledo, O.

Columbia Mills, Inc., Saginaw, Mich.

Columbia Steel Co. (Sub. United States Steel Corp.), Russ

Bldg., 235 Montgomery St., San Francisco, Cal. Columbia Vari-Speed Co., 214 W. Wesley, Wheaton, Ill. Columbian Enameling & Stamping Co., 1536 Beech St.,

Terre Haute, Ind.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Co-

lumbus, O.
Columbus Metal Products, Inc., 767 N. 4th St., Columbus, O.
Comet Electric Company, 1237 St. Paul St., Indianapolis,
Ind.

Comfort Products Corporation, 163 E. 154th St., Harvey, Ill.

•Commercial Shearing & Stamping Co., 1775 Logan, Youngs-

town, Ohio. Commonwealth Electric Welder Mfg. Co., 3200 Oxford St., Philadelphia.

Compton Shear Co., W. H., 314 Camden, Newark, N. J.

Conco Corporation, Mendota, Ill.

Conco Engineering Works, Mendota, Ill.

Condensation Engineering Corp., 2515 S. Archer Ave., Chicago, Ill.

cago, Ill.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago.
Congress Die Casting Div., Congress Tool & Die Co., 3752
East Outer Drive, Detroit.
Connor Eng. Corp., W. B., 114 E. 32nd St., New York City.
Connors Paint Mfg. Co., Wm., 669-683 River St., Troy, N. Y.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Continental Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machines Incorporated, 1201 Washington Ave.,
South, Minneapolis.

Continental Electric Co., Inc., 323 Ferry St., Newark, N. J. Continental Machines Incorporated, 1301 Washington Ave., South, Minneapolis.
Continental Products Co., 1150 E. 222nd St., Euclid, O. Continental Rubber Works, 1900 Liberty Parkway, Erie, Pa. Continental Screw Co., Mt. Pleasant, New Bedford, Mass. Continental Steel Corp., 1108 S. Main St., Kokomo, Ind. Continental Steel Corp., 1108 S. Main St., Kokomo, Ind. Continental Stove Corp., Front & Walnut, Ironton, O. Cook, Inc., A. D., Lawrenceburg, Ind.
Cook Electric Co., 2700 Southport Ave., Chicago, Ill. Coolmaster Corp., 530 S. Dearborn St., Chicago, Cooper Co., Clark, 159 Jefferson St., Philadelphia. Cooper & Cooper, Inc., 37 Fenn St., Pittsfield, Mass. Cooper Oven Thermometer Co., Pequabuck, Conn. Copeland Refrigeration Corp., Sidney, Ohio.
Copper Roofs Corp., 5060 Plankinton Bldg., Milwaukee. Copperweld Steel Co., Glassport, Pa.
Coppus Engineering Corp., 344 Park Ave., Worcester, Mass. Corbin Screw Corp., 330 High St., New Britain, Conn. Corbman Bros., Inc., 1205 N. Fourth St., Philadelphia, Pa. Cork Import Corp., 330 W. 42nd St., New York City. Cork Insulation Co., Inc., 155 E. 44th St., New York City. Cornell Iron Works, Inc., 36th Ave. & 13th St., Long Island City, N. Y.
Corozone Air Conditioning Corp., 1422 Euclid Ave., 1110 Hanna Bldg., Cleveland, O.
Cox Roofing Co., 1014 North-West Blvd., Winston-Salem, N. C.
Cramer Company, Inc., The R. W., Centerbrook, Conn.

N. C.
Cramer Company, Inc., The R. W., Centerbrook, Conn.
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
Crary Mfg. Co., 396 N. Second St., Middleport, O.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Electric Mfg. Co., 14-16 E. Ohio Ave., Mt. Vernon, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cross Engineering Co., 160-178 Dundaff St., Carbondale, Pa.
Crouch Corporation, Birmingham, Mich.
Crowe Name Plate & Mfg. Co., 3701 Ravenswood Ave., Chicago.

cago.
Crown Cork & Seal Co., 4401 Eastern Ave., Baltimore.
Crown Fuel Saver Co., Richmond, Ind.
Crown Iron Works, 1229 N. E. Tyler, Minneapolis, Minn.
Crucible Steel Co. of America, 405 Lexington Ave., New York

City.

Crystal Refrigerator Co., Fremont, Nebr.

Cugley Incubator Co., Elkhart, Ind.

Curtis Refrigerating Machine Co., 1946 Kienlen Ave., St.

Louis, Mo. Cutler-Hammer, Inc., N. 12th St. and W. St. Paul Ave., Mil-waukee, Wis.

D. & M. Mfg. Co., 51 Lincoln Ave., Midland Park, N. J. Dahlstrom Metallic Door Co., S. E. Cor. E. Second & Buffalo Sts., Jamestown, N. Y. Dallas Engineering Co., Inc., 1115 Hall, Dallas, Texas. Dallman Supply Co., 6th & Q Sts., Sacramento, Cal. Dalzen Manufacturing Co., 511 Lieb St., Detroit. Daniels Mfg. Co., Inc., Sam, Daniels Rd., Hardwick, Vt. Danville Stove & Mfg. Co., Beaver St., Danville, Pa. Davidson Hy Duty Roof Fan Co., Newton, Mass. Davies Air Filter Corp., 390 4th Ave., New York City. Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago. Day Co., The, 2938 Pillsbury Ave., Minneapolis, Minn. Day & Night Manufacturing Co., Monrovia, Cal. Dayton Greenhouse Mfg. Co., P. O. Box 801, Dayton, O. Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton, O.

Dayton Rogers Mfg. Co., 2830 13th Ave., So., Minneapolis. Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Day-

Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton, O.
Debevoise Co., 968 Grand St., Brooklyn, N. Y.
De Bothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
Defender Automatic Regulator Co., 308 S. 8th St., St. Louis.
De Laval Steam Turbine Co., 300 Nottingham Way, Trenton, N. J.
De La Vergne Engine Co., 940 Simpson St., Eddystone, Pa.
D'Elia Oil Burner Co., Inc., 145 Stratford Ave., Bridgeport, Conn.

Ave., Rochester, N. Y.

Obeloo Products Division, General Motors Corp., 329 E. First

St., Dayton, O.
Delta Stoker Co., Foot of Commonwealth, North Chicago,

111.

Deming Co., 148 Actna St., Salem, O. Demuth & Sons, Charles, 112 New York Blvd., Jamaica, N. Y.

Deniston Co., 4856 S. Western Ave., Chicago, Ill.
 Densmore-Quinlan Co., 910 74th St., Kenosha, Wis.
 Deshler Foundry & Machine Works, 140-142 S. East Ave.,

Deshler, O.
Des Moines Stove Repair Co., 107 S. W. Second St., Des

Des Moines Stove Repair Co., 107 S. W. Second St., Des Moines, Ia.

Detroit Air Meter Co., Box 1473, Detroit, Mich.

Detroit Lubricator Co., 5900 Trumbull Ave., Detroit, Mich.

Detroit Michigan Stove Co., 6900 E. Jefferson Ave., Detroit.

Detroit Moulding Div., 9210 Russell St., Detroit.

Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit.

Detroit Stamping Co., 350 Midland Ave., Detroit.

Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit.

Detroit Stoker Co., General Motors Bldg., Detroit, Mich.

(Sales & Engineering); Monroe, Mich. (Main Office & Works).

Works)

Works).

Detroit Surfacing Machine Co., 7433 W. Davison St., Detroit.

Detroit Torch & Mfg. Co., 12057 Cardoni Ave., Detroit.

De Vilblss Co., 300 Phillips Ave., Toledo, O.

Devlin Mfg. Co., Thos., Burlington, N. J.

Diamond Castings Co., Terra Cotta Rd., Johnsonburg, Pa.

Diamond Chain & Mfg. Co., 400 Kentucky Ave., Indianapolis,

Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.

Diamond Mfg. Co., 243 W. 8th St., Wyoming, Pa.

Diamond Metal Weather Strip Co., 650 N. 4th St., Columbus Co. bus, O.

bus, O.

Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.

Dickey-Grabler Co., 10298 Madison Ave., Cleveland.

Dickson Co., 310 S. Michigan Ave., Chicago.

Dickson Coal Co., 17 Battery Place, New York City.

Dickson Weatherproof Nail Co., P. O. Box 466, Evanston,

Ill.

Dieckmann Co., Ferdinand, 1182 Harrison St., Cincinnati, O.

Diehl Mfg. Co., Trumbull St., Elizabethport, N. J.

Diener Mfg. Co., Geo. W., 400 N. Monticello Ave., Chicago.

Disston & Sons, Inc., Henry, Unruh & Milner Sts., Tacony

Sta., Philadelphia.

Dockson Corporation, 3847 Wabash Ave., Detroit.

Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.

Doheny Co., John J., 326 Lake St., Belmont, Mass.

Dornback Furnace & Fdry. Co., 724 E. 103rd St., Cleveland.

Dowagiac Steel Furnace Co., Beeson St., Dowagiac, Mich.

Downs-Smith Brass & Copper Co., 304-320 E. 45th St., New

York City.

Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand

Rapids, Mich.

Dracco Corp. 4057 E. 116th St., Cleveland, O.

Dragert Company, C. H., Inc., 227 India St., Brooklyn, N. Y.

Drayer & Hanson, Inc., 738 E. Pico Blvd., Los Angeles.

•Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago, Ill.

Dry-Zero Corporation, 222 W. North Bank Drive, Chicago.

Dunham Co., C. A., 450 E. Ohio St., Chicago, Ill.

Dunn, Inc., Struthers, 1315 Cherry St., Philadelphia, Pa.

Duo-Therm Division, Motor Wheel Corporation, Lansing,

Mich.

du Pont de Namoure & Co. E. V.

Mich.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
Duriron Co., Inc., 450 N. Findlay St., Dayton, Ohio.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dusing & Hunt, Inc., 1927 Elimwood Ave., Buffalo, N. Y.

Dwyer Mfg. Co., F. W., 565 W. Washington St., Chicago.
Dyer Welder & Engineering Co., 7 E. 19th St., Kansas City,

Dynamic Welder Co., 2226 Silverton Rd., Chicago.

Eagle-Picher Lead Co., Temple Bar Bldg., Cincinnati, O. East Anaheim Sheet Metal Works, 2299 E. Anaheim Blvd., Long Beach, Cal.

Easternoil, Inc., 133 Marginal Way, Portland, Me.

Eav-Tex Company, 1109 Garfield Ave., Upper Darby, Pa.

Eclipse Air Brush Company, Inc., 308 Park Ave., Newark,
N. J. Eclipse Aviation Div. Bendix Aviation Corp., Bendix, N. J.

Econocol Stoker Divison of Cotta Transmssion Corp., 2340 11th St., Rockford, Ill. Economy Baler Co., 1020 N. Main St., Ann Arbor, Mich. Economy Electric Manufacturing Co., 4634 W. 21st Pl.,

Cicero, III.

Economy Pumps, Inc., 2522 W. Congress St., Chicago.

Eddy Stoker Corp., 4717 W. North Avenue, Chicago.

Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.

N. J.
Edwards Furnace Co., 25 East Ave., Wellsboro, Pa.
Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Elermann Floor Scraper Co., 1971 Fulton St., Brooklyn, N. Y.
Eiker Mfg. Company, Ogaliala, Nebr.
Elsler Engineering Co., 761 S. 13th St., Newark, N. J.
Elco Tool & Screw Corporation, 1800 Broadway, Rockford,
Ill.

Electric Arc Cutting & Welding Co., 152 Jelliff Ave., Newark, N. J.

Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O. Electric Furnace-Man, Inc., 101 Park Ave., New York City. Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minne-

Electric Materials Co., Clay & Washington Sts., North East, Pa.

Electric Soldering Iron Co., Inc., Deep River, Conn. Electric Sprayit Co., 224 N. Broadway, Milwaukee, Wis. Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleve-

land, O.
Electric Valve Mfg. Co., Inc., 68 Murray St., New York City.
Electrimatic Corp., 2100 S. Indiana, Chicago, Ill.
Electro Specialty Company, 2938 Fourth Ave., South, Minne-

Electro Specialty Company, 2938 Fourth Ave., South, Minneapolis.

Electroaire Corp., 1455 W. Congress St., Chicago, Ill. Electrogas Furnace Co., 2575 Bayshore Blvd., San Francisco. Electrol, Inc., 934 Main Ave., Clifton, N. J. Electrovent Corp., 5245 Western Ave., Detroit, Mich. Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago, Ill. Electrovent Fan & Mfg. Co., 6970 W. Jefferson Ave., Detroit. Eligo Shutter & Mfg. Co., 6970 W. Jefferson Ave., Detroit. Elison Draft Gage Co., 214 W. Kinzie St., Chicago, Ill. Elsey Metal Specialties Co., 1535 Spruce St., Detroit, Mich. Emerson Electric Mfg. Co., 1843 Washington Ave., St. Louis. Empire Door Co., Inc., 226 E. 144th St., New York City. Empire Metal Co., 820 E. Water St., Syracuse, N. Y. Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O. Emrich Co., Inc., 312 Broad St., Columbus, O. Engelhard, Inc., Chas., Newark, N. J. Engineering and Research Corporation, Riverdale, Md. Enterprise Foundry Co., 171 York St., Rochester, N. Y. Ergolyte Mfg. Co., 3644 Lawrence St., Philadelphia. Eselgroth & Co., 22 Edison Place, Newark, N. J. Esko Mfg. Corp., 3409 McKinney St., Houston, Tex. Essick Manufacturing Co., 1950 Santa Fe Ave., Los Angeles, Cal.

Estate Stove Co., Hamilton, O. Etched Products Co., 3901 Queens Blvd., Long Island City. Evanol Heater Div., Evans Products Co., Union Guardian Bldg., Detroit.

Bldg., Detroit.

Evans Corp., George, 121 37th St., Moline, Ill.

Everhot Mfg. Co., 57 S. 19th Ave., Maywood, Ill.

Everite Pump & Mfg. Co., Inc., 617 N. Price St., Lancaster,

Excello Oil Heating Corp., 111½ S. 24th St., Omaha, Nebr.

• Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago.

Excelsior Stove & Mfg. Co., 504 S. Front St., Quincy, Ill.

Excelsior Tool and Machine Co., 31st & Ridge Ave., East

St. Louis, Ill.

Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ili.
Fairfield Oil Heating Co., Inc., Mason St., Greenwich, Conn.
Fairmont Aluminum Co., Fairmont, W. Va.
Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.
Familian Pipe & Supply Co., 1101 Mateo St., Los Angeles.
Faraday Engineering Co., 56 Clearway St., Back Bay,
Boston. Faraday E Boston.

Bardady Engineering Co., 56 Clearway St., Back Bay, Boston.

Fargo Foundry Co., 92 N. P. Ave., Fargo, N. D.
Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.

Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.
Farquhar Furnace Co., 920-930 Enos Ave., Springfield, Ill.
Faultiess Heater Corp., 16402 St. Clair Ave., Cleveland, O.
Favorite Stove Co., Young & Weber Sts., Piqua, O.
Fedders Mfg. Co., Inc., 57 Tonawanda St., Buffalo, N. Y.
Federal Machine & Welder Co., 212 Dana St., Warren, O.
Federal Mogul Corp., 11031 Shoemaker St., Detroit.
Fee & Mason Mfg. Co., 81 Beekman St., New York City.
Fee and Stemwedel, Inc., 4949 N. Pulaski Rd., Chicago, Ill.
Felters Co., Inc., 210 South St., Boston, Mass.

Fern, Ralph, 2430 Boulevard Ave., Scranton, Pa.
Ferro Enamel Corporation, 4150 E. 56th St., Cleveland.
Field Mfg. Co., 2328 Nelson St., Chicago, Ill.
Figge Mfg. Co., 189 W. Madison St., Chicago, Ill.
Fingles Company, The, Reisertown Road at Elgin Ave.,
Baltimore, Md.
Finnell Rotary Stokers, Inc., 602 East St., Elkhart, Ind.

Finnell Rotary Stokers, Inc., 502 East St., Elkhart, Ind.

Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago, Ill.

Firemood Machine Wks., Converse, Ind.

Firestone Tire & Rubber Co., Firestone Park, Akron, O.

Fir-Tex Insulating Board Co., St. Helens, Ore.

Fisher Governor Co., 203 S. First Ave., Marshalltown, Ia.

Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City.

Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City, N. Y.

Flexo Supply Co., Inc., 4221 Olive St., St. Louis.

Flintkote Co., 50 W. 50th St., New York City.

Floral City Co., 402 S. Monroe St., Monroe, Mich.

Florence Stove Co., 205 School St., Gardner, Mass.

Floyd-Wells Co., Royersford, Pa.

Fluid Heat Division Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore.

Flynn & Emrich Co., 301 Holliday St., Baltimore, Md.

Follansbee Steel Corporation, 3rd & Liberty Aves., Pittsburgh.

burgh. Folsom Snow Guard Co., 80 Boylston St., Boston, Mass. Foote Foundry Co., J. B., N. Main St., Fredericktown, O. Forct-Air Co., 840 Cedar St., Rockford, Ill. Ford Roofing Products Company, 111 W. Washington St.,

Chicago.
Forest City Foundries Co., 2500 W. 27th St., Cleveland, O. Forker Corporation, 4614 Prospect Ave., Cleveland.
Forman Machine & Electric Corp., 550 Seventh Ave., New

Forker Corporation, 4614 Prospect Ave., Cleveland.
Forman Machine & Electric Corp., 550 Seventh Ave., New York City.
Foster Wheeler Corp., 165 Broadway, New York City.
Fowler-Pem Co., 5317 Horton St., Emeryville, Cal.
Fox Control & Mfg. Co., 1785 Wayside Rd., Cleveland.
Foxboro Co., Neponset Ave., Foxboro, Mass.
Franklin Gas Heating Co., 1232 Vine St., Cincinnati, O.
Fraser and Johnston Co., 725 Potrero Ave., San Francisco.
Frederick Iron & Steel Co., E. 7th & East Sts., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Fresh'nd-Aire Co., 210 N. Clinton St., Chicago.
Frick Co., Waynesboro, Pa.
Friedley-Voshart Co., 763 W. Lexington St., Chicago.
Friez & Sons, Julien P., 4 N. Central Ave., Baltimore.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
Front Rank Furnace Div., Liberty Foundry Co., Sidney & Ohio Sts., St. Louis.
Fuel Savers Inc., 15th & Herr Sts., Harrisburg, Pa.
Fuller-Warren Co., 2506 N. 32nd St., Milwaukee, Wis.
Fulton Sylphon Co., Knoxville, Tenn.
Furblo Co., Hermansville, Mich.
Furnaceslave, Inc., 1080 E. 52nd St., Indianapolis, Ind.

G. & O. Mfg. Co., 138 Winchester Ave., New Haven, Conn.
G. & S. Tool Co., 8790 Grinnell, Detroit, Mich.
G. D. S. Machinery & Supply Co., 101 Walker St., New York

G. & S. Tool Co., 5790 Grinnell, Detroit, Mich.
G. D. S. Machinery & Supply Co., 101 Walker St., New York
City.
Gale Products, Galesburg, Ill.
Galva Heater Co., Galva, Ill.
Gammeter Co., W. F., Lincoln Ave. Extension, Cadis, O.
Gar Wood Industries, Inc., 7924 Riopelle St., Detroit.
Garber Lumber & Construction Co., Strasburg, O.
Garden City Fan Co., 332 S. Michigan Blvd., Chicago, Ill.
Gardiner Metal Co., 2504 W. 48th Pl., Chicago, Ill.
Gardiner Manufacturing Co., Horicon, Wis.
Gascol Furnace Co., Gas City, Ind.
Gascol Furnace Co., The, 3126 Preble Ave., Pittsburgh.
Gascoril Mfg. Corp., Genoa City, Wis.
Gasweld Equipment Co., 625 W. Jackson Blvd., Chicago, Ill.
Gates Rubber Co., 999 S. Broadway, Denver, Colo.
Gaul Air Conditioner Co., 3116 N. Main St., Dayton, Ohio.
Gehi Bros. Mfg. Co., West Bend, Wis.
Gehri Co., 1117 Tacoma Ave., Tacoma, Wash.
General Air Conditioning Corp., 4411 Appleton St., Cincinnati, Ohio.

General Air Conditioning Corp., 4411 Appleton St., Cincinnati, Ohio.
General Aire Company, 118 N. Sixth St., Philadelphia.

General Blower Co., 403 N. Peoria St., Chicago.
General Blower Corp., 1450 Army St., San Francisco.

General Blower Corp., 1450 Army St., San Francisco.

General Controls Co., 801 Allen Ave., Glendale, Cal.
General Electric Co., Air Cond. Div., 5 Lawrence St., Bloomfield, N. J.

General Equipment Co., 311-15-19 S. Wichita St., Wichita, Kan.

Kan.

General Etching & Mfg. Co., 3076 W. Grand Ave., Chicago. General Gas Light Co., Kalamazoo, Mich. General Insulating & Mfg. Co., 126 Fairview Ave., Alex-

andria, Ind. General Insulating Products Co., 3821 15th Ave., Brooklyn. General Machine Co., Inc., 816-826 E. 140th St., New York

City.

General Machinery Co., 3500 Riverside Ave., Spokane, Wash.

General Metal Products Co., 3833 Delor St., St. Louis, Mo.

General Oil Heating Corp., 528 Jefferson St., West New

York, N. J.

General Plate Co., 34 Forest St., Attleboro, Mass.

General Refrigeration Division, Yates-American Machine

Co., Shirland Ave., Beloit, Wis.

General Regulator Corp., 2608 Arthington St., Chicago, Ill.

General Sales & Products Co., 242 Saratoga St., Cohoes, N. Y.

General Stokers, Inc., 2925 N. Broad St., Philadelphia.
Gerard Chemical Co., 87 Front St., Elizabeth, N. J.
Gerett Corp., M. A., 2947 N. 30th St., Milwaukee.
Gerhardt, W. F., 2007 W. Broad St., Richmond, Va.
Gerstein & Cooper Co., 1 W. Third St., South Boston, Mass.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th
St., Milwaukee, Wis.
Giant Grip Mfg. Co., 31 Osceola St., Oshkosh, Wis.
Giant Grip Mfg. Co., 31 Osceola St., Oshkosh, Wis.
Giant Mfg. Company, South Ave., Council Bluffs. Ia.
Gibraltar Engineering Co., 910 N. Orange Dr., Los Angeles.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Gilbert & Son, Harry E., 11 Brooklawn Terrace, Bridgeport,
Conn. Conn.

Gillen Company, J. L., Dowagiac, Mich.
Gillian Mfg. Co., 7752 Dubols St., Detroit.
Gillen Co., L. H., Cottman & Keystone Sts., Tacony, Philadelphia, Pa.
Gilt Edge Furnace & Manufacturing Co., 193 S. 2nd St.,
Milwaukee.
Glasby Manufacturing Co., Inc., J. P., Locust Ave. & Nelson St., Bloomfield, N. J.
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Glesson-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glidden Co., 11001 Madison Ave., Cleveland, O.
Globe Iron Roofing & Corrugating Co., P. O. Box 734, Cincinnati, O.
Globe Machine & Stamping Co., 1250 W. 76th St., Cleve-Globe Machine & Stamping Co., 1250 W. 76th St., Cleve-Globe Machine & Stamping Co., 1205-211 W. Court Ave., Des Moines, Ia.

G. M. Mfg. Co., Box 151 Madison Square Station, New York Golden-Anderson Valve Specialty Co., Fulton Bidg., Pitts-burgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
Gold Seal Furnace Co., 234 S. Fourth St., Minneapolis, Minn.
Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Yonkers, N. Y.
Goodrich Co., B. F., 500 S. Main St., Akron, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 605 W. Main St., Oklahoma City, Okla.
Grabler Manufacturing Co., 6565 Broadway, Cleveland.
Grammes & Sons, Inc., L. F., 388 Union St., Allentown, Pa.
Grand Rapids Blow Pipe and Dust Arrester Co., 525 Monroe
Ave., Grand Rapids, Mich.
Grand Rapids Die & Tool Co., 113-117 Michigan St., Grand
Rapids, Mich.
Grand Rapids Wire Products Co., 503 Front Ave., N. W.,
Grand Rapids, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City,
Ill. Ill.

Grant Wilson, Inc., 4101 W. Taylor St., Chicago.
Gray, G. L., 507 Grand Ave., New Haven, Conn.

Gray Metal Products, Inc., 30 Carlton St., Rochester, N. Y.
Great National Air Conditioning Corp., 1305 S. Lamar St., Dallas Green Colonial Furnace Company, 322 S. W. Third St., Des Moines, Ia.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Mfg. Co., 605 W. Washington St., Chicago.
Greene, Tweed & Co., 101 Park Ave., New York City.
Greenlee Tool Co., Rockford, Ill.
Grinnell Co., Inc., 260 W. Exchange St., Providence, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York City.
Griswold Mfg. Co., 1001-1065 W. 12th St., Erie, Pa.
Grob Brothers, Grafton, Wis.
Grobet File Corp. of America, 3 Park Place, New York City.
Grossenbacher Furnace Co., 9410 Milton Ave., St. Louis.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago.
Guardian Utilities Co., 215 E. Michigan St., Michigan City, Ind. Green Colonial Furnace Company, 322 S. W. Third St., Des

Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.

Hague & Co., Inc., Alfred, 227 34th St., Brooklyn, N. Y. Hall Mfg. Co., Cedar Rapids, Ia. •Hall-Neal Furnace Co., 1324 N. Capitol Ave., Indianapolis, Ind. Ind.

Hallstead Iron Foundry, Hallstead, Pa.

Hamilton Automatic Stoker Corp., 1637 Dixie Highway,

Hamilton, O.

Hammett Mfg. Co., 209 W. 19th Ter., Kansas City, Mo.

Hammond Aircraft Corp., South San Francisco, Cal.

Hammond Machinery Builders, 1626 Douglas Ave., Kalamazoo, Mich.

Hampton Elec. Tool Co., 700 Walnut St., Edgewood, Pittsburgh, Pa. Handelan Washed Air Co., 305 Fifth St., S., Minneapolis. Handley Brown Heater Co., 209 E. Washington Ave., Jack-son, Mich.

Handy & Harmon, 82 Fulton St., New York City. Hardinge Oil Burner Co., 1770 Berteau St. at Ravenswood, Chicago, Ill.

Hardy Mfg. Co., 126 Davis Ave., Dayton, O. Hare Stoker Corp., 4853 Rivard St., Detroit, Mich. Harnischfeger Corp., 4400 W. National Ave., Milwaukee. •Harrington & King Perforating Co., 5649 Fillmore St., Chicago, Ill. rris, A. R., 4546 Hohman Ave., Hammond, Ind.

Harris Calorific Co., 5501 Cass Ave., N. W., Cleveland, O. •Hart & Cooley Mfg. Co, Holiand, Mich. Chicago Office, 61 W. Kinzie St. Hart & Crouse Corporation, 301 Turner St., Utica, N. Y. Hart Mfg. Co., Bartholomew & Hamilton Sts., Hartford,

Conn Hart Mfg. Co., 2006 N. Western Parkway, Louisville, Ky. Hart Oil Burner Corp., 2200 N. Adams St., Peoria, Ill. Hartzell Propeller Fan Co., 1025 Roosevelt Ave., Piqua, O. Harvey-Whipple, Inc., 55 Emery St., Springfield, Mass. Haskins Co., R. G., 616 S. California Ave., Chicago. Hassall, Inc., John, Clay & Oakland Sts., Brooklyn, N. Y. Hastings Air Conditioning Company, Inc., Box 481, 108 S.

Colorado Ave., Hastings, Nebr.

Colorado Ave., Hastings, Nebr.

Hauck Mfg. Co., 124-136 Tenth St., Brooklyn, N. Y.

Hauserman Co., E. F., 6800 Grant Ave., Cleveland.

Hays Corp., E. Eighth St., Michigan City, Ind.

Hays Mfg. Co., 801 W. 12th St., Erie, Pa.

H-B Instrument Co., Inc., 2518 N. Broad St., Philadelphia.

Health-O-Mist Humidifier Mfg. Co., James St., Columbus,

Wis. Wis.

Wis.

Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.

Heath & Milligan Mfg. Co., Div. of The Glidden Co., 1833
S. Normal Ave., Chicago, Ill.

Heating Assurance, E. 124 Augusta, Spokane, Wash.

Heating Equipment Co., 1123 Harrison St., San Francisco.

Heatlox Furnaces, Inc., 4320 S. Tacoma Way, Tacoma,

Wash

Heating Equipment Co., 1123 Harrison St., San Francisco. Heatlox Furnaces, Inc., 4320 S. Tacoma Way, Tacoma, Wash.

Heatseal Burner Co., 2501 Leavenworth St., Omaha, Nebr. Heckler Bros., 955 Liberty Ave., Pittsburgh, Pa. Hegeler Zinc Co., P. O. Box 599, Danville, Ill.

Heil Co., 3000 W. Montana St., Milwaukee, Wis. Hemp Co., Macomb, Ill.

Hendley & Whittemore Co., 6 Blackhawk Blvd., Beloit, Wis. Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa. Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn. Henry & Wright Mfg. Co., 3473 E. 49th St. Cleveland, O. Herbert & Sons, T. L., 6th & Harrison St., Nashville, Tenn. Her-Born Eng. & Mfg. Co., Box 666, Sandusky, O. Herbusch Corporation, The, Simplex Control Div., 706 Chestnut St., St. Louis.

Herco Oil Burner Corp., 109 Chestnut St., Lancaster, Pa. Hercules Chemical Co., Inc., 332 Canal St., New York City. Heritage Stoker Sales, Inc., 105 E. 63rd St., Chicago, Ill. Herrmann & Grace Co., 671 Bergen St., Brooklyn, N. Y. Herron-Zimmers Moulding Co., 3654 Beaufait, Detroit, Mich. Herske & Timmis, Inc., 33 W. 60th St., New York City. Hess-Snyder Co., Massillon, O.

Hess Warming & Ventilating Co., 1221-1227 S. Western Ave., Chicago, Ill.

Hetzel Roofing Products Co., 67 Main St., Newark, N. J. Higgin Products, Inc., Newport, Ky.

Hill Co., E. Vernon, 6628 W. Highland Ave., Chicago, Ill. Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y. Hinde & Dausch Paper Co., Sandusky, O. Hipoint Corp., Water, Elm & Arnold Sts., Bellefontaine, O. Hirschman Co., Inc., W. F., 220 Delaware Ave., Buffalo, N. Y. Hobart Brothers Co., Canal Lock Square, Troy, O. Hoffman Specialty Co., Inc., 77 Bedford St., Stamford, Conn. Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Ind.

Holley Heating & Mfg. Co., 21 S. Chester St., Pasadena, Cal. Holtum Mfg. Co., Freeport, Ill.

apolis, Ind.

Holley Heating & Mfg. Co., 21 S. Chester St., Pasadena, Cal.
Holtum Mfg. Co., Freeport, Ill.
Holtser-Cabot Electric Co., 125 Amory St., Boston, Mass.
Home Furnace Co., 5th St. & P. M. R. R., Holland, Mich.
Home Stove Co., 501 Kentucky Ave., Indianapolis, Ind.
Homer Furnace & Foundry Corporation, Coldwater, Mich.
Hones, Inc., Charles A., 122 S. Grand Ave., Baldwin, N. Y.
Hood Co., B. Mifflin, Daisy, Tenn.
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.
Horton Mfg. Co., 3008 University Ave., S. E., Minneapolis.
Hossfeld Mfg. Co., Winona, Minn.
Hotentot Co., Inc., 2423 Farnam St., Omaha, Nebr.
Hotstream Heater Co., 3007 Grand Ave., Cleveland, O.
Hough Shade Corporation, 1027 S. Jackson St., Janesville,
Wis.

Wis.

Howe & Bassett Co., Inc., 840 University Ave., Rochester, N. Y.

Howe Ice Machine Co., 2825 Montrose Ave., Chicago.

Howell Electric Motors Co., Howell, Mich.

Howes Co., S. M., 511 Medford St., Charlestown District, Boston, Mass.

Hubbard Co., 1014 Marquette Ave., Minneapolis, Minn.

Hubbell Corp., 1316 W. Carroll Ave., Chicago.

Hub Specialty Co., 84 Governor Winthrop Rd., Somerville, Mass.

Mass.

Hudson Equipment Corp., 324 Third Ave., N., Minneapolis.

Hudson-Root Company, P. O. Box 124, Brocton, N. Y.

Hugo Mfg. Co., 49th Ave., W. & Superior St., Duluth, Minn.

Hunt & Son, C. B., Box 300, Salem, Ohio.

Hunter Fan & Ventilating Co., Sterick Bldg., Memphis,

Hussey & Co., C. G., 2850 Second Ave., Pittsburgh, Pa. Huwer Heating Corp., 2375 West Fort St., Detroit.
 Huyette Co., Inc., Paul B., Philadelphia.
 Hyatt Bearings Division, General Motors Sales Corp., Harrison, N. J.

Ice Cooling Appliance Corp., Morrison, Ill. Ideal Commutator Dresser Co., 1084 Park Ave., Sycamore, Ill. Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O. Ideal Furnace Co., 2995 E. Grand Blvd., Detroit, Mich. Ideal Heating Corp., 807 East Gage Ave., Los Angeles, Cal. Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.
Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, Ill.
Illinois Testing Laboratories, Inc., 412 N. LaSalle St., Chi-

cago, Ill.
Illinois Zinc Co., Peru, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
Imperial Electric Co., Ira Ave., Akron, O.
Imperial Molded Products Corp., 2925 W. Harrison St., Chicago

cago.
Independence Stove & Furnace Co., Cor. Hayward & Cottage, Independence, Mo.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Independent Register Co., 3747 E. 93rd St., Cleveland, O. Indian Trailer Corporation, Koolroom Div., 2338 Indiana Ave., Chicago, Ill.
Industrial Engineering Co., Evansville, Ind.
Industrial Manufacturing & Eng. Co., Chicago.
Industrial Research, Lansdowne, Pa.
Industrial Sheet Metal Works, Inc., 628 E. Forest Ave., Detroit.

Detroit.

Detroit.
Ingels Elbow Machine Corp., 2634 Fullerton Ave., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., 310 S.
Michigan Ave., Chicago, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Inter-Coastal Paint Co., 15th & Southern R. R., East St.

Inter-Coastal Paint Co., 15th & Southern R. R., East St. Louis, III.
Insto-Gas Corporation, 1900 E. Jefferson, Detroit.
Insul-Wool Insulation Corp., Wichita, Kansas.
Insulite Co., 1100 Builders Exchange Building, Minneapolis.
International Engineering, Inc., 1145 Bolander, Dayton, O.
International Engineering Wks., Inc., Framingham, Mass.
International Heater Co., 101 Park Ave., Utica, N. Y.
International Moistening Co., 489 S. Main St., Providence,

R. I.

R. I.

International Nickel Co., Inc., 67 Wall St., New York City.
International Steel Co., 1556 Edgar St., Evansville, Ind.
International Vermuculite Co., 11th & Stanford Ave.,
Springfield, Ill.

Interstate Machinery Co., Inc., 1431 W. Pershing Road,

Chicago.
Interstate Metal Products Company, Inc., 4401 Ogden Ave., Chicago

Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadel-

phia, Pa.
Iowa Foundry Co., W. 2nd & Cook, Sioux City, Ia.
Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland, O.
Iwan Brothers, 1503 Prairie Ave., South Bend, Ind.

Jackson-Bangor Slate Co., Pen Argyl, Pa. Jackson Sheet Metal Works, 3012 Washington Ave., Ogden, Utah.

Utah.

Jacobs Co., B. & J., 1725 Johns St., Cincinnati, O.

Jacobson Machine Works, Inc., A. E., 1090 Tenth Ave., S. E.,

Minneapolis, Minn.

Jaden Mfg. Co., Inc., F., 1601 2nd St., Hastings, Nebr.

Jamar Co., Walker, 367 S. First Ave., E., Duluth. Minn.

James Regulator Co., Inc., Peacock St., Pottsville, Pa.

Jamestown Metal Corp., Jamestown, N. Y.

Jamieson Mfg. Co., 2608 Swiss Ave., Dallas, Texas.

Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.

Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.

Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts.,

Cincinnati, Ohio.

Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts., Cincinnati, Ohio.

Jeffrey Mfg. Co., The, 862 N. 4th St., Columbus, Ohio. Jelliff Mfg. Corp., C. O., Southport, Conn.

Jessop Steel Co., Washington, Pa.

Jewel Mfg. Co., 1874 Highland Parkway, St. Paul.

Jewelt Stove & Foundry Corp., Military Rd., Buffalo, N. Y.

Jiffy Manufacturing Co., Hillside, N. J.

Joal Mfg. Corp., 2058 Canton St., Toledo.

Johns-Manville, 22 E. 40th St., New York City.

Johnson Bronze Co., S. Mill St., New Castle, Pa.

Johnson Co., S. T., 940 Arlington Ave., Oakland, Cal., and

401 N. Broad St., Philadelphia, Pa.

Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar

Rapids, Ia.

Rapids, Ia.

Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago.

Johnson, Inc., William, Brenner & Kent Sts., Newark, N. J.
Johnson Mfg. Co. Tenth & Sycamore, Waterloo, Ia.
Johnson Service Co., 507 E. Michigan St., Milwaukee, Wis.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago, Ill.
Johnston Co., Wm. W., 115 Bayard St., Dayton, O.
Johnston Gas Furnace Corp., 11847 Vose St., North Hollywood, Cal.

wood, Cal.
Johnston Mfg. Co., 2825 E. Hennepin Ave., Minneapolis.
Johnston Tin Foil & Metal Co., 6100 S. Broadway, St. Louis.
Joliet Heating Corp., 1403 Herkimer St., Joliet, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pitts-

burgh, Pa. Jones Foundry & Machine Co., W. A., 4401 W. Roosevelt

Rd., Chicago, Ill.

Jones Products Corporation, Ferndale, Mich.

Jordan & Co., Paul R., 631 S. Delaware St., Indianapolis, Ind.

Kals Sunrise Works, 5659 Linwood Ave., Detroit, Mich. Kaiser Co., H. S., 3336 Franklin Blvd., Chicago. Kane Mfg. Corporation, Lock Box 81, Kane, Pa. Katelman Foundry & Mfg. Co., Council Bluffs, Iowa. Kauffman Air Conditioning Corp., 4336 W. Pine St., St. Louis, Mo.
Kaustine Co., Inc., Perry, N. Y. Kawneer Co., Niles, Mich.

Kaustine Co., Inc., Perry, N. Y.
Kawneer Co., Niles, Mich.
Kaybar Burner Corp., 4545 Cottage Grove Ave., Chicago, Ill.
Keasbey Co., Robert A., 139 W. 19th St., New York City.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keith Furnace Co., Dean Ave. at E. 26th, Des Moines, Ia.
Keidur Corp., 420 Lexington Ave., New York City.
Keller, Inc., Wm. H., Grand Haven, Mich.
Kelly Mfg. Co., Houston, Texas.
Kelsey Heating Co., Inc., 277 James St., Syracuse, N. Y.
Kelvinator Division, Nash-Kelvinator Corp., 14250 Plymouth
Rd., Detroit.
Kelvin-White Co., 90 State St., Boston.
Kennard, Inc., Sam, 3331-3339 Market St., St. Louis.
Kennard, Inc., David E., 60 Second Ave., Brooklyn, N. Y.
Kent Co., Inc., 167 Canal St., Rome, N. Y.

•Kent Co., Inc., J. King, 6477 Manchester Ave., St. Louis.
Kernchen Co., 103 E. Wacker Dr., Chicago, Ill.
Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill.
•Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington,
Vt.

Vt.

Kimberly-Clark Corp., 8 S. Michigan Ave., Chicago.

King Metal Co., 414 N. W. Fourth St., Oklahoma City, Okla.

King Ventilating Co., Box 178, Owatonna, Minn.

Kinnear Mfg. Co., P. O. Box 598, Columbus, O.

Kirk & Blum Mfg. Co., 2820 Spring Grove Ave., Cincinnett O.

nati, O.

Kisco Co., Inc., 39th & Chouteau Ave., St. Louis.

Kitson Co., Westmoreland & Stokley Sts., Philadelphia, Pa.

Klauer Mfg. Co., 9th & Washington St., Dubuque, Ia.

Klee Co., Geo. B., 1056-58 Hulbert Ave., Cincinnati, O.

Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.

Kleen-Heet, Inc., 1823 Carroll Ave., Chicago, Ill.

Klein Stove Co., Trenton Ave. & Tioga St., Philadelphia, Pa.

Kleink's Aviation Snips, 107 E 5th St., Wilmington, Del.

Knickerbocker Co., Jackson, Mich.

Knowles Air Conditioning, 1324 Marshall St., N. E., Minneapolis.

apolis.

Knowles Mushroom Ventilator Co., 11 Label St., Montclair,

Kol-Master Corp., Oregon, Ill.
Koons Furnace Co., 219 W. Van Buren, Danville, Ill.
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Korfund Co., Inc., 48-15 32nd Pl., Long Island City, N. Y.
Korth Oil Burner Corp., 123 Hawthorne St., Roselle Park,

Korth Oil Burner Corp., 123 Hawthorne St., Roselle Park, N. J.

Kraissl Co., Inc., 620 Main St., Hackensack, N. J.

Kraker, Henry, 54 W. 14th St., Holland, Mich.

Kramer Trenton Co., 626 Brunswick Ave., Trenton, N. J.

Krehblel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.

Kruse & Dewenter Co., 427-429 E. Washington St., Indianapolis, Ind.

Laclede-Christy Clay Products Co., 411 N. Seventh St., St.
Louis, Mo.
Laclede Steel Co., Arcade Bidg., St. Louis, Mo.
Laco Oil Burner Co., 238 Union St., Griswold, Ia.
La Crosse Steel Roofing & Corrugating Co., 300 S. Third
St., La Crosse, Wis.
Ladon Co., 902 S. Wabash Ave., Chicago.
Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.

•Lamneck Products, Inc., Cremo Ave., Middletown, Ohio.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland.
Landwehr Heating Corp., 6th & Cayuga Sts., Philadelphia.
Langsenkamp Co., F. H., 229 E. South St., Indianapolis, Ind.
Larkin Coils, Inc., 519 Fair St., S. E., Atlanta, Ga.
Lastik Products Co., Inc., 604 American Bank Bldg., Pittsburgh, Pa.,

•Lau Blower Co., Home & Orchard Ave., Dayton, O. Laclede-Christy Clay Products Co., 411 N. Seventh St., St.

Layne & Bowler, Inc., Memphis, Tenn.
Leach Co., 412 S. Main St., Oshkosh, Wis.
Leahy Manufacturing Co., 1804 E. 8th St., Los Angeles.
Lecourtenay Co. 5 Main St., Newark, N. J.
Ledkote Products Co., 35-01 Vernon Blvd., Long Island Ledkote Products Co., 35-01 Vernon Bivd., Long Island City, N. Y.

Lee Furnace Co., 308 E. LaSalle, South Bend, Ind.

Lee & Son Co., K. O., Aberdeen, S. D.

Lee & Son, Thomas, 128-132 W. Second St., Cincinnati, O.

Leeds & Northrup Co., 4953 Stenton Ave., Philadelphia, Pa.

Lees, John, Div., Serrick Corp., Muncie, Ind.

Leeson Co., T. F., 14631 Meyers Rd., Detroit, Mich.

Leffel & Co., James, 426 East St., Springfield, O.

Lehigh Fan & Blower Co., Front & Linden Sts., Allentown,

Pa. Pa.
Lehlgh Fan & Blower Co., Front & Linden Sts., Altertown, Pa.
Lehon Company, 4411 Oakley Ave., Chicago.
Leland Electric Co., 1501 Webster St., Dayton, O.
Lennox Furnace Co., 200 Lincoln Highway, Marshalltown, Ia., and Syracuse, N. Y.
Leslie Welding Co., 2943 Carroll Ave., Chicago.
Levow, David, 308 W. 20th St., New York City.
Lewellen Mfg. Co., Columbus, Ind.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis, Mo.
Libbey-Owens-Ford Glass Co., Box 919, Toledo, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Lincoln Electric Co., 12818 Coit Rd., Cleveland, O.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
Linderme Machine & Tool Co., Inc., 12233 Coyle Ave., Detroit. Linear Packing & Rubber Co., Inc., State Road & Levick Linear Packing & Rubber Co., Inc., State Road & Levick St., Philadelphia.

Link-Belt Co., Stoker Div., 2410 W. 18th St., Chicago, Ill. Lion Mfg. Corp., 2640 W. Belmont Ave., Chicago. Liquefied Gas Appliance Co., Mars, Pa. Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.

Little Burner Co., Inc., H. C., 2nd & Lincoln, San Rafael,

Little Giant Vaporizer Co., 5101 Classen Blvd., Oklahoma City, Okla. Little Janitor Furnace Clock Co., 621 Broadway, New York

Little Janitor Furnace Clock Co., 621 Broadway, New York City.

Littleford Bros., 457 E. Pearl St., Cincinnati, O. Livingston Repair, South Fountain St., Marshall, Mich.

Lochinvar Products Division of Michigan Tank & Furnace Corp., 14247 Tireman Ave., Dearborn, Mich.

Lockformer Co., 4615 Arthington St., Chicago, Ill. Lockjoint Wood Products Co., 1721 Mildred St., Wichita, Kan

Kan.
Logan-Long Co., 37 W. Van Buren St., Chicago, Ill.
Lohman, Inc., William J., 62 Ninth Ave., New York City.
Lonergan Manufacturing Co., Albion, Mich.
Lord Mfg. Co., 1641 W. 12th St., Erie, Pa.
Lovejoy Flexible Coupling Co., 5001 W. Lake St., Chicago.
Lowell Air Conditioning Corp., Otis Building, Philadelphia.
Ludlow-Saylor Wire Co., Newstead Ave. & Wabash R. R.,
St. Louis Mo.

St. Louis, Mo. Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago. Lukens Metal Co., Thos. F., Hedley & Bath Sts., Philadelphia.

phis.

Lukens Steel Co., 308 S. First Ave., Coatesville, Pa.

Lustro Coated Sheets Co., 1220 Ridge Ave., Pittsburgh, Pa.

Lyman Co., H. B., Southampton, Mass.

Lyon Conklin & Co., Inc., Race & McComas St., Baltimore.

Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J. McClure Builders' Supply Co., 68 E. Clark St., East Pales tine, O.

McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit.

McCorkle Co., D. H., Sixth & Bancroft Way, Berkeley, Cal.

Macrae, Inc., 554 Vanderbilt Ave., Brooklyn.

McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.

McKay Co., York, Pa.

McLeod & Henry Co., Inc., 395A First St., Troy, N. Y.

McLouth Air Conditioning Corporation, 2400 E. Michigan

Ave., Lansing, Mich.

McNamee Products, 370 Hazel Ave., Glencoe, Ill.

McPherson Furnace & Supply Co., 1805 N. E. 2nd Ave.,

Portland, Ore.

McQuay, Inc., 1600 Broadway, N. E., Minneapolis, Minn. tine. O. Portland, Ore.

McQuay, Inc., 1600 Broadway. N. E., Minneapolis, Minn.

MaGirl Foundry & Furnace Works, P. H., 401-413 E. Oakland Ave., Bloomington, Ill.

Magnet Switch Co., 361 W. Superior St., Chicago.

Mahan Oil Burner & Furnace Co., Lake & Church, Elmhurst, Ill.

Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.

Maid-O'-Mist, Inc., 215 N. Aberdeen St., Chicago, Ill.

Majestic Co., 733 Eric St., Huntington, Ind.

Majestic Flashing Company, Reisterstown Rd. at Elgin
Ave., Baltimore.

Majestic Furnace Co., 1723 Westlake Ave. N., Seattle, Wash. Ave., Baltimore.

Majestic Furnace Co., 1723 Westlake Ave. N., Seattle, Wash.
Mall Tool Company, 7740 South Chicago Ave., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long
Island City, N. Y.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan,
Inc., 61 Willett St., Passaic, N. J.

Manheim Manufacturing and Belting Co., Manheim, Pa. Manker Products Co., Inc., 921 Rayner St., Memphis, Tenn. Manley Products Corp., State & Hay Sts., York, Pa. Manning, Maxwell & Moore, Inc., American Schaeffer & Budenberg Instrument Div., 11 Elias St., Bridgeport, Conn.

Manufacturer's Fin Coil Co., 2505 S. Pulaski Rd., Chicago.

Maple City Furnace Co., 605 S. Main St., Monmouth, Ill.

Maple Valley Mfg. Co., First St., Mapleton, Ia.

Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago.

Marathon Electric Mfg. Corp., 131 W. Washington St.,

Wausau, Wis.

Marblehead Lime Co., 160 N. LaSalle St., Chicago.

Marble-Card Electric Co., Gladstone, Mich.

Marion Furnace Co., 1441 Brooklyn Ave., Detroit.

Marion Machine, Foundry & Supply Co., P. O. Box 685

Marion, Ind. Marion Machine, Foundry & Supply Co., P. O. Box 880
Marion, Ind.
Marley Co., 3001 Fairfax Rd., Kansas City, Kan.
Marlin-Rockwell, Jamestown, N. Y.
Marlo Coll Company, 6135 Manchester Ave., St. Louis.
Marquette Mfg. Co., Inc., 401-409 Johnson St., N. E., Minneapolis, Minn.

Marsh Corporation, Jas. P., 2073 Southport Ave., Chicago.

Marsh Lumber Co., Inc., 535-611 Tuscarawas Ave., Dover, Ohlo Ohio

Marshall Furnace Co., Marshall, Mich.

Marshallan Mfg. Co., 5716 Euclid Ave., Cleveland.

Marshalltown Mfg. Co., 901 E. Nevada St., Marshalltown, Ia.

Martin, J. O., and C. U., 647 Minna St., San Francisco

Martin Metal Mfg. Co., 900 E. 2nd St., Wichita, Kan.

Martin-Parry Corp., W. Market St., York, Pa.

Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia, Pa.

Mason-Nellan Regulator Co., 435 N. Michigan Ave.,

Chicago. Chicago.

Mason & Sons, F. E., Batavia, N. Y.

Masonite Corp., 111 W. Washington St., Chicago, Ill.

Masonite Corp., Cellufoam Products Div., 6565 S. Lavergne
Ave., Chicago.

Master Electric Co., 126 Davis Ave., Dayton, O.

Matthews & Co., J. H., 480 Canal St., New York City.

Matthiessen & Hegeler Zinc Co., LaSalle, Ill.

Mauer Engineering, 2525 Colfax St., Evanston, Ill.

Maurath, Inc., 7309 Union Ave., Cleveland, O.

Maurey Mfg. Corp., 2915 S. Wabash Ave., Chicago.

Maxfield Manufacturing Co., 519 S. Main St., Temple, Tex.

Maxim Silencer Co., 410 Asylum St., Hartford, Conn.

Mayfair Furnace Co., 1118 N. Orange Grove Ave., Hollywood,
Cal. Chicago. May-Fiebeger Co., S. 21st St., Newark, O.
Mayflower Air Conditioners, Inc., Duluth Ave. & E. Seventh St., St. Paul, Minn.
Mayflower Oil Burner Corp., 5002 Hudson Blvd., West New York, N. J. May Oil Burner Corp., Maryland Ave. & Oliver St., Baltimore, Md.

Maysteel Products, Inc., Horicon St., Mayville, Wis.

Maze Co., W. H., 2500 S. Water St., Peru, Ill.

Medart Co. 3500 DeKałb St., St. Louis, Mo.

Meier Electric & Machine Co., 3525 E. Washington St., Meier Electric & Machine Co., 3525 E. Washington St., Indianapolis, Ind.
Melbye Bros., Inc., 3204 N. Oakley Ave., Chicago, Ill.
Mellish & Murray Co., 1715 Carroll Ave., Chicago, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia, Pa.

•Mercold Corp., 4201 Belmont Ave., Chicago, Ill.
Mercury Clutch Corporation, 637 W. Third St., Massillon, O.
Meriam Co., 1955 W. 112th St., Cleveland.
Mesker & Co., Geo. L., 400 N. W. First St., Evansville, Ind.
Metal Door & Trim Co., La Porte, Ind.
Metal Marker Co., 1380 E. 40th St., Cleveland, O.
Metal & Thermit Corp., 120 Broadway, New York City.
Metalace Corp., 60 K St., South Boston, Mass.
Metalizing Co., 1351 E. 17th St., Los Angeles, Cal.
Metals Coating Co. of America, 495 N. Third St., Philadelphia, Pa. delphia, Pa. Metropolitan Refining Co., 23 50th Ave., Long Island City, Metropolitan Refining Co., 23 50th Ave., Long Island City, N. Y.

Metzner Stove Repair Co., 515 Wyandotte, Kansas City, Mo.

Meyer & Bro. Co., F., 308 Commercial St., Peoria, Ill.

Meyer Furnace Co., 1300 S. Washington St. Peoria, Ill.

Meyer Mfg. Co., 4833 Wabash Ave., Detroit.

Micheli Air Conditioning Co., Inc., 1725 State St., Schenectady, N. Y.

Michigan Tank & Furnace Corp., 14101 Prairie Ave., Detroit, Mich.

Micro-Products Co., 20 N. Wacker Dr., Chicago.

Micro-Westco, Inc., Bettendorf, Ia.

Middleton Mfg. & Sales Co., 125 N. First St., Minneapolis.

Midwest Aluminum Products, Inc., 123 E. Pittsburgh Ave.,

Milwaukee, Wis.

Milwaukee, Wis.

Midwestern Supply Co., 314 Stanley Terrace, Chicago.

Milburn Co., Alexander, 1426 W. Baltimore St., Baltimore.

Milcor Steel Co., 4117 W. Burnham St., Milwaukee, Wis.

Miller Co., Meridan, Conn.

Miller-Connell Mfg. Co., Inc., 222 W. North Bank Dr.,

Chicago.

Miller & Doing, Inc., 58 York St., Brooklyn, N. Y.
Miller & Son, C. Arthur, 202-204 S. Main St., Elmira, N. Y.
Miller Electric Mfg Co., Inc., 905 N. Meade St., Appleton,

Miller Floor Furnace Co., 741 E. 14th St., Oakland, Cal. Advertisement in this issue. See Index to Advertisers, page 304

Chicago.

Miller Range & Furnace Co., Wm., 810-812 Main St., Cin-Miller Range & Furnace Co., Wm., \$10-813 Main St., Cincinnati, O.
Miller Rubber Co., Inc., 1247 S. High St., Akron, O.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mill-Rose Co., 2498 E. 79th St., Cleveland, O.
Mills Novelty Co., 4110 W. Fullerton Ave., Chicago, Ill.
Milwaukee Brush Mfg. Co., 2236 N. 30th St., Milwaukee.
Milwaukee Gas Specialty Company, 2025 W. Clybourn, Milwaukee. waukee. Mineral Insulation Co., 103rd & South West Highway, Chi-Mineral Insulation Co., 103rd & South West Highway, Chicago Ridge, Iil.

Minneapolis Automatic Draft Regulator Co., 506 Produce Exchange Bidg., Minneapolis, Minn.

Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave., S. Minneapolis, Minn.

Minn-Kota Foundry & Mfg. Co., 201 Second St., N. Fargo, N. D. Minn-Kota Founds,
N. D.
Minster Machine Co., Minster, O.
Misener Mfg. Co., Inc., 326 E. Washington St., Syracuse,
N. Y.

Class Company, 220 Fifth Ave., New York City. N. Y.

Mississippi Glass Company, 220 Fifth Ave., New York City.
Mississippi Glass Company, 220 Fifth Ave., New York City.
Mission Water Heater Co., 7101 McKinley Ave., Los Angeles.
Mitchell Moulding Co., 1501 Circle Ave., Forest Park, Ill.
Mitchell & Smith, Inc., 9469 Copeland Ave., Detroit.
Modern Engineering Co., 3411 Pine Blvd., St. Louis, Mo.
Modern Equipment Corp., Defiance, Ohio.
ModernAire Engineering Co., 107 S. W. Second Ave., Des
Moines, Ia.
Modine Mfg. Co., 17th St., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond
Hill, N. Y.
Mohler Co., J. K., The, 151 Church Ave., Ephrata, Pa.
Mojonnier Brothers Co., 4601 W. Ohio St., Chicago.
Moloch Foundry & Machine Co. Kaukauna, Wis.
Monarch Furnace Fittings Manufacturers, 2240 W. 49th St.,
Chicago, Ill. Monarch Furnace Fittings Manufacturers, 2240 W. 49th St., Chicago, Ill.

Monarch Heating Co., 4661 Alger St., Los Angeles.

Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia, Pa.

Moncrief Furnace Co., P. O. Box 1673, Atlanta, Ga.

Moncrief Furnace & Manufacturing Co., Inc., 3903 Main St., Dallas, Texas.

Monitor Controller Co., 51 S. Gay St., Baltimore, Md.

Monmouth Products Co., 1929-41 East 61st St., Cleveland, O. Montag Stove & Furnace Works, 2011 N. Columbia Blvd., Portland, Ore. Portland, Ore.

Montgomery Brothers, 61 Fremont St., San Francisco, Cal.

Moore Corp., Benton St., Joliet, Ill.

Moore Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.

Moran Flexible Steam Joint Co., 217 W. Main St., Louisville, Ky.
Morris Machine Works, 31 E. Genesee St., Baldwinsville,
N. Y. Morrison Products, Inc., 16816 Waterloo Rd., Cleveland. Morrison Steel Products, Inc., 601 Amherst St., Buffalo, Mortell Co., J. W., 310 S. Michigan Ave., Chicago, Ill. Motex Metal Process Corporation, 4473-4475 W. Jefferson Ave., Detroit. Motorstoker Div. Hershey Machine & Foundry Co., Manheim, Pa. Mountain States Equipment Co., 1238 Speer Blvd., Denver, Mountain States Equipment Co., 1238 Speer Blvd., Denver, Colo.

Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Iil.
Mueller Brass Co., Lapeer Ave., Port Huron, Mich.
Mueller Co., Decatur, Iil.

Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee, Wis.

Mullins Mfg. Corp., Warren, O.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis.
Muncie Gear Works, Inc., N. Vine St., Muncie, Ind.
Mundet Cork Corp., 450 7th Ave., New York City.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City, N. J.

Munn and Steele, Inc., 130 Lister Ave., Newark, N. J. N. J.
Munn and Steele, Inc., 130 Lister Ave., Newark, N. J.
Murray Co., Dallas, Tex.
Murray Corporation of America, 7700 Russell St., Detroit.
Murray Manufacturing Co., D. J., 1002-24 Third St., Wausau, Wis.
Murray Tile Co., Cloverport, Ky.
Myers & Bro. Co., The F. E., Ashland, O.
Myers Electric Co., 410 Third Ave., Pittsburgh, Pa.

## N

Nash Engineering Co., Wilson Ave., South Norwalk, Conn. Nash Refrigeration Co., Inc., Summit, New & Bleecker Sts., Newark, N. J. National Airoil Burner Co., 1284 E. Sedgley Ave., Philadelphia. National Brass & Copper Co., Inc., Lisbon, Ohio. National Engineering Products, Inc., Commerce & Savings

Bldg., Washington, D. C. National Fireproofing Corp., 202 E. Ohio St., N. S., Pitts-National Friedrooning Corp., 202 E. Onio St., N. S., Fitte burgh, Pa. National Foundry & Furnace Co., Station "B," Dayton, O. National Gypsum Co., Delaware Ave., Buffalo, N. Y. National Iron Works, Foot of 7 Ave., San Diego, Cal.

National Lead Co., 111 Broadway, New York City.

National Lock Co., Inc., Rockford, Ill.

National Machine Tool Co., 1536 Clark St., Racine, Wis.

National Machine Works, 122 S. Michigan Ave., Chicago, Ill.

National Mfg. Corp., 151 Fillmore Ave., Tonawanda, N. Y.

National Manufacturing & Engineering Co., 416 Stephenson Bldg., Detroit. Bldg., Detroit.

National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, O. National Sheet Metal Co., 1617-1629 Water St., Peru, Ill. National Stainless Clip Corporation, 51 Chambers St., New York City.

National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Stoker Factory Sales Co., 2737 Washington Ave.,

St. Louis.

National Steel Corp., Grant Bldg., Pittsburgh.

National Super Service Co., 1944 N. 13th St., Toledo, O. Nebel Manufacturing Co., P. O. Box 3942, Shaker Sq. Sta-

Nebel Manufacturing Co., P. O. Box 3942, Shaker Sq. Station, Cleveland.

Neemes Foundry, Inc., 286 First St., Troy, N. Y.

Nelson Co., 2604 4th Ave., Detroit, Mich.

Nelson Corp. Herman, 1824 Third Ave., Moline, Ill.

Nelson Mfg. Co., B. F., Cor. Main & Marshall Sts., N. E., Minneapolis, Minn.

Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia.

New-Aire Blower Co., 14384 Longacre Ave., Detroit.

New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.

New Departure, Div. General Motors Sales Corp., Bristol, Conn.

Conn.

Conn.

New Haven Copper Co., Seymour, Conn.

New Jersey Zinc Co., 160 Front St., New York City.

Newman Brothers, Inc., 662-670 W. 4th St., Cincinnati, Ohio.

New Mission Htg. & Vent. Co., 3401 Mission St., San Fran-New Monarch Machine & Stamping Co., 406 S. W. 9th St.,

New Monarch Machine & Stamping Co., 406 S. W. 9th St.,
Des Moines, Ia.

Newport Rolling Mill Co., Div. Andrews Steel Co., 9th &
Lowell Sts. Newport, Ky.

New York Blower Co., 3155 Shields Ave., Chicago, Ill.

Niagara Blower Co., 6 E. 45th St., New York City.

Niagara Machine & Tool Works, 637-697 Northland Ave.,
Buffalo, N. Y.

Nice Ball Rearing Co. 20th & Nicetown Lane Philadelphia

Buffalo, N. Y.
Nice Ball Bearing Co., 30th & Nicetown Lane, Philadelphia.
Nicholson & Co., W. H., 12 Oregon St., Wilkes-Barre, Pa.
Niles Rolling Mill Co., Niles, O.
Niles Steel Products Division, Republic Steel Corp., Niles,

Ohio. Onio.

Norge Heating & Conditioning Div., Borg-Warner Corp., 670 E. Woodbridge St., Detroit, Mich.

Norma-Hoffman Bearings Corp., Stanford, Conn.

Norman Sheet Metal Mfg. Co., W. F., 212-236 N. Cedar St.,

Nevada, Mo.
Norristown Magnesia & Asbestos Co., Washington St., Below Ford St., Norristown, Pa.
North American Fibre Products Co., Keith Building, Cleve-

North American Fibre Products Co., Keith Building, Cleve-land, Ohio.

North Bangor Slate Co., Bangor, Pa.

Northern Blower Co., 6409 Barberton Ave., Cleveland, O.

Northern Furnace & Supply Co., 25th St. & 2nd Avenue North, Billings, Mont.

Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria, Ill. Northern Weatherstrip Co., 367 S. 1st Ave., E., Duluth, Minn. Northwest Stove Works, 2345 S. E. Gladstone St., Portland, Ore.

Northwestern Stove Repair Co., 662 W. Roosevelt Rd., Chi-Northwestern Stove Repair Co., 2008, Cago, III.

Nortmann-Duffke Co., 2740 S. 32nd St., Milwaukee, Wis.

Norwin Co., East Album St., Freeport, III.

Norwood Filtration Co., N. Maple St., Florence, Mass.

Nugent Sons, Inc., Thes., 223 E. 80th St., New York City.

Nu-Way Corp., The, 2416 Fourth Ave., Rock Island, III.

Oakland Foundry Co., Avenue A & L & N Tracks, Belleville, Ill.
O'Brien Varnish Co., 101 N. Johnson St., South Bend, Ind. Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, O. Ohio Foundry and Manufacturing Co., Steubenville, O. Ohio Products Co., 16507 Lucille Ave., Cleveland, O. Ohio Welder Co., Middlefield, O. Ohio Wire Products Co., 219 W. Third St., Dover, O. Ohi & Co., Geo. A., 151-161 Oraton St., Newark, N. J. Ohmlac Paint & Refining Co., 6550 S. Central Ave., Chicago. O'Keefe & Merritt Co., 3700 E. Olympic Blvd., Los Angeles. Olsen Manufacturing Co., The C. A., Elyria, O. Omaha Stove Repair Works, 1206 Douglas St., Omaha, Nebr. Orbon Stove Co., L. & N. and Sycamore St., Belleville, Ill. "Original" Metal Flanging Machine Works, 952 20th Ave., Seattle, Wash. Oakland Foundry Co., Avenue A & L & N Tracks, Belle-"Original" Metal Flanging Machine Works, 952 20th Ave., Seattle, Wash.
Ormsby-Osterman Company, 3631 Cass Ave., St. Louis.

OSborn Co., J. M. & L. A., 1541 E. 38th St., Cleveland, O. Osborn Mfg, Co., 5401 Hamilton Ave, Cleveland, O. Otis Steel Co., 3841 Jennings Rd., Cleveland, O. OverSpred Stoker Co., Fulton, Jackson & Jefferson Sts., Ottawa, Ill.

Owen-Dyneto Div. USL Battery Corp., Syracuse, N. Y. Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo, O.

Ozone Air Company, 928 Cherry St., S. s., Grand Rapids, Ozo-Ray Process Corp., 400 N. Sangamon St., Chicago.

Pacific Gas Heating Co., 245 Van Ness Ave., South, San Francisco.

Pacific Gas Radiator Co., Roseberry and Walter Sts., Huntington Park, Cal.

Pacific Lumber Co., 100 Bush St., San Francisco, Cal. Packham Crimper Co., Oak St. & N. Y. C. Depot, Mechanicsburg. O.

burg, O.

Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.

Paine Co., 2951 W. Carroll Ave., Chicago.

Paint-Point Corporation, 275 Passaic St., Newark, N. J.

Palmer Co., 2501 Norwood Ave., Norwood, Cincinnati, O.

Palmer Electric Co., 20 Sproat St., Detroit, Mich.

Palmer Mfg. Co., 3890 E. 91st St., Cleveland.

Palmer's Manufacturing Corp., Phoenix, Ariz.

Pan-American Engineering Company, 320 Parker St.,

Berkeley, Cal.

Pangborn Corp., Pangborn Blvd., Hagerstown, Md.

Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.

Paragon Oil Burner Corp., 75 Bridgewater St., Brooklyn,

N. Y.

Park City Cornice Works, Inc., 55 McKinley Ave., Bridge-

Park City Cornice Works, Inc., 56 McKinley Ave., Bridge-

Paragon Oil Burner Corp., 76 Bridgewater St., Brooklyn, N. Y.

Park City Cornice Works, Inc., 56 McKinley Ave., Bridgeport, Conn.

Parker Appliance Co., 17325 Euclid Ave., Cleveland.

Parker Heating & Manufacturing Co., 1627 Third Ave., S., St. Petersburg, Fla.

Parker-Kalon Corp., 190-192 Varick St., New York City.

Parkersburg Iron & Steel Co., Parkersburg, W. Va.

Parker-Cramer Co., 970 Main St., Fitchburg, Mass.

Patent Novelty Co., 312 Eighth St., Fulton, Ill.

Patterson Foundry & Machine Co., East Liverpool, O.

Patterson Foundry & Machine Co., East Liverpool, O.

Patterson Shade Co., 1525 N. Meridian St., Indianapolis, Ind.

Payne Furnace & Supply Co., 338 N. Foothill Rd., Beverly Hills, Cal.

Peabody Engineering Corp., 530 Fifth Ave., New York City.

Peacard Co., M. A., 195 Dudley St., Boston.

Peck, Stow & Wilcox Co., Center St., Southington, Conn.

Pecch, Stow & Wilcox Co., Center St., Southington, Conn.

Pecrless Electric Co., 2000 W. Market St., Warren, O.

Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis, Ind.

Peerless of America, Inc., 515 W. 35th St., Chicago, Ill.

Peerless Oil Burner Co., Inc., 3926 Main St., Kansas City, Mo.

Peerless Pump Div., Food Machinery Co., 1250 Camden Ave., Canton, Ohio.

Pels & Co., Inc., Henry, 90 West St., New York City.

Pencilsharp Awl & Tool Co. 1423-25 E. Illinois St., Evansville, Ind.

Penn Boller & Burner Mfg. Corp., 359 N. Market St., Lancaster, Pa.

Penn Electric Switch Co., Box 556, Goshen, Ind.

Penn Tool Company, 2415 N. Howard St., Philadelphia, Pa.

Pennsylvania Engineering Works, 526 S. Jefferson St., New Castle, Pa.

Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St.
Powers Lane, Philadelphia.

Pennsylvania Fiexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia.

Pennsylvania Furnace & Iron Co., P. O. Box 269, Warren, Pa. Pentecost & Craft Co., 429 Wabash Ave., Terre Haute, Ind. Peoples Oil Burner Co., 466 W. Superior St., Chicago. Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield, Mass. Perfection Stove Co., 7609 Platt Ave., Cleveland, O. Perfex Corp., 500 W. Oklahoma Pl., Milwaukee, Wis. Perham Products, Inc., 133 N. Wacker Drive, Chicago. Perkins Machine Co., 4 Perkins Ave., Warren, Mass. Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass. Perkinson & Brown, 412 N. Wolcott Ave., Chicago. Pernot & Rich, Inc., 2546 San Fernando Rd., Los Angeles. Peterson "Freezem" Mfg. & Sales Co., 316 Southwest Blvd., Kansas City, Mo.

Petroleum Heat & Power Co., Stamford, Conn. Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill. Pfeifer, Wm., 416 Greenwich St., New York City. Pfening Co., Fred D. 1075 W. 5th Ave., Columbus, O. Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York City.

Phellips Cooling Tower Co., 5700 Roosevelt Rd., Chicago.

City.

Pheoli Manufacturing Co., 5700 Roosevelt Rd., Chicago.

Phoenix Ice Machine Co., 2711 Church St., Cleveland.

Phelps Mfg. Co., 801 Thomas St., Little Rock, Ark.

Philadelphia Gear Co., Erie Ave. & G St., Philadelphia.

Philadelphia.

Phillips Drill Co., 1537 W. Cortland St., Chicago. Piatt Products Corp., 1149 S. Pennsylvania Ave., Lansing. Mich.

Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich. Pilley Packing and Flue Brush Mfg. Co., Fort Madison, Ia.

Pioneer Heat Regulator Division, Master Electric Co., 100

Davis Ave., Dayton, Ohio. Pioneer Manufacturing Co., 714 Oakland N. E., Cedar Rapids,

Pioneer Roofing & Sheet Metal Co., 226 W. Main St., Musko-

Pioneer Roofing & Sheet Metal Co., 226 W. Main St., Musko-gee, Okla.

Pioneer Water Heater Co., 3005 Andriba St., Los Angeles.

Pittsburgh Furnace Parts Co., 109 Federal St., Pittsburgh.

Pittston Stove Co., P. O. Box 29, Pittston, Pa.

Piandaire, Inc., P. O. Box 7350, Oakland Sta., Pittsburgh.

Plant Rubber & Asbestos Works, 537 Brannan St., San Francisco.

Plastergon Wall Board Co. Philadelphia Ave., Buffalo, N. Y.

Plastic Products Co., 6475 Georgia Ave., Detroit, Mich.

Pleasantaire Corp., 329 Tower Bldg., Washington, D. C.

Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago, Ill.

cago, Ill.

Plymouth Cordage Co., Court St., North Plymouth, Mass.

(Anderson Products, Inc., Cambridge, Mass., National Sales Agents.)

Plymouth Industries Inc., 1932 Harrison Ave., Plymouth,

Ind.

Pocahontas Fuel Company Incorporated, Stoker Div., 1190
E. 152nd St., Cleveland.

Poe Co., C. W., 2795 E. 83rd St., Cleveland.

Poe, Ralph W., 44 White Ct., Canton, Ill.

Polk Mfg. Co., 2021-23 Winnebago St., Madison Wis.

Pomona Pump Co., 206 E. Commercial St., Pomona, Cal.

Poole Foundry & Machine Co., 1700 Union Ave., Woodberry,

Baltimore Baltimore.

Baltimore.

Porcelain Steels, Inc., Cedar & Ashland Rd., Cleveland.

Portland Stove Fdry. Co., Portland, Me.

Potomac Mfg. Co., 316 S. 10th St., Philadelphia, Pa.

Power King Tool Corporation, P. O. Box 150, Warsaw, Ind.

Powers Regulator Co., 2720 Greenview Ave., Chicago, Ill.

Practical Instrument Co., 2713 N. Ashland Ave., Chicago.

Prat-Daniel Corporation. Port Chester, N. Y.

Precision Control Co., 899 Bryant St., San Francisco.

Precision Thermometer & Instrument Co., 1434 Brandywine

St., Philadelphia, Pa.

Preferred Utilities Manufacturing Corp., 33 W. 60th St.,

New York City.

Premier Furnace Co., Box 150, Dowagiac, Mich.

Premier Metal Etching Co., 21-03 44th Ave., Long Island

City.

City.

Presstite Engineering Co., 3900 Chouteau St., St. Louis, Mo. Pressure Oil Burners, Inc., 55 N. Broad St., York Pa. Progressive Company, 20 E. Jackson Blvd., Chicago. Propellair, Inc., 1345 Lagonda Ave., Springfield, O. Pryne & Co., Inc., 1245 E. 33rd St. Los Angeles, Cal. Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis, Mo.

Louis, Mo.
Pulvokol, Inc., 406 S. Second Ave., Minneapolis, Minn.
Pynosol Laboratories, Inc., 215 N. Aberdeen St., Chicago.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chi-

cago, III.

Pyramid Metals Co., 1334 N. Wells St., Chicago.

Pyrolite Products Co., 1221-31 W. 74th St., Cleveland, O.

Quaker Mfg. Co., 223 W. Erie St., Chicago, Ill. Quick Furnace & Supply Co., 210 Court St., Des Moines, Ia. •Quickwork-Whiting Div., Whiting Corporation, Harvey, Ill. Quiet Heet Burner Co., 1555 Coney Island Ave., Brooklyn,

Quimby Pump Co., Inc., 340 Thomas St., Newark, N. J.

Quincy Stove Manufacturing Co., 807 S. Front St., Quincy,
Ill.

R-S Products Corp., 4530 Germantown Ave., Philadelphia, Pa. Racine Stoker Mfg. Co., 1014 Eighth St., Racine, Wis. Racine Tool & Machine Co., Erskine & Cook Sts., Racine, Wis.

Wis.

Radiator Specialty Co., 1722 Dowd Rd., Charlotte, N. C.
Rafter Machine Co., 259 Stephen St., Belleville, N. J.
Ramey Mfg. Co., 243 N. 5th St., Columbus, O.
Ranco Inc., 601 W. Fifth Ave., Columbus, O.
Randall Graphite Products Corp., 609 W. Lake St., Chicago.
Ransome Concrete Machinery Co., Industrial Div., Dunellen,
N. J.

N. J.
Ravenna Furnace & Heating Co., Ravenna, O.
Rawlplug Co., Inc., The, 98 Lafayette St., New York City.
Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco, Cal.
Red Jacket Mfg. Co., Davenport, Ia.
Reed Unit-Fans, Inc., 811 St. Charles St., New Orleans, La.
Reeves Pulley Co., 100 N. Wilson St., Columbus, Ind.
Reeves Steel & Mfg. Co., Dover, O.
Refractory & Insulation Corp. 381 Fourth Ave., New York City.

Refrigeration Appliances, Inc., 923 W. Lake St., Chicago, Ill. Refrigeration Economics Co., Inc., 1232 Second St. N. E.,

Canton, Ohio.

Rega Mfg. Co., 79 Mt. Hope Ave., Rochester, N. Y.

Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn,
N. Y. Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo, O.

Reif-Rexoil, Inc., 37 Carroll St., Buffalo N. Y. Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg.,

Indianapolis, Ind. Reiner & Campbell, Inc., 242 Lafayette St., New York City. Reliable Gas Products Co., 1024 Second Ave., S. W., Cedar Rapids, Ia.

Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliance Automatic Lighting Co., 1929 Mead St., Racine,
Wis.

Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, O. Reliance Refrigeration Machine Co., 3401 N. Kedzie Ave.,

Chicago, Ill.
Rempe Co., 340 N. Sacramento Ave., Chicago, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngs-

town, O.

Republic Steel Corp., Republic Bldg., Cleveland, O.
Research Corp., 405 Lexington Ave., New York City.
Research Products Corporation, 1011 E. Washington Ave., Madison, Wis.
Retinning Manufacturing Co., 3021 Greenview Ave.,

Chicago. Revere Copper and Brass Incorporated, 230 Park Ave., New

York City.

Reynolds Electric Company, 2685 W. Congress St., Chicago.

Reynolds Manufacturing Co., 412 Prospect N. E., Grand

Rapids, Mich.
Reynolds Metals Co., Inc., Federal Reserve Bank Bldg.,

Reynolds Metals Co., Inc., Federal Reserve Bank Bidg., Richmond, Va.

Rex Clay Products Company. 14414 Dexter Blvd., Detroit. Reznor Mfg. Co., Lock Box 231, Mercer, Pa.

Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn. Ribside Furnace Co., 119½ Clinton St. Wausau, Wis. Richards-Wilcox Mfg. Co., Third St., Aurora, Ill. Richardson & Boynton Co., 274 Madison Ave., New York

City.

City.

Richmond Fireproof Door Co., Richmond, Ind.
Richmond Radiator Co., Inc., Uniontown, Pa.

Riseter & Themacher Co., 1526 W. 25th St. Cleveland.
Right Way Shield Company, 955 Spitzer Bldg., Toledo.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rising & Nelson Slate Co., West Pawlet, Vt.
Rival Strap Corporation, 308 W. 20th St., New York City.
Riverton Lime & Stone Co., Inc., Riverton, Va.
Roan Mfg. Co., 1220 Washington Ave., Racine, Wis.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo.
Roberts-Hamilton Co., 707-715 S. Third St., Minneapolis.
Roberts Tube Works, 2500 Military Ave., Detroit.

Robertson, F. L., 56 Rano St., Buffalo, N. Y.
Robertson, Co., H. H., 2400 Farmers Bank Bldg. Pittsburgh.
Robinson Insulation Co., Great Falls, Mont.
Rochester Lead Works, Inc., 380 Exchange St., Rochester,
N. Y.

N. Y.

N. Y.
Rochester Mfg. Co., Brighton Station, Rochester, N. Y.
Rock Fleece Company, 115 Durango St., El Paso, Texas.
Rock Island Register Co., 2425 Fifth Ave., Rock Island, Ill.
Rock Island Stove Co., 200 Fourth St., Rock Island, Ill.
Rockford Brass Works, Rockford, Ill.
Rock River Machine, Div. of Hannifin Mfg. Co., 621 S.
Kolmar Ave., Chicago.
Rockwood Mfg. Co., 1801 English Ave., Indiananolis, Ind.
Rock Wool Products Co., Inc., P. O. Box 276, Wabash, Ind.
Rockling's Sons Co., John A., 640 S. Broad St., Trenton, N. J.
Roesch & Associates, Inc., 120 E. Washington St., Syracuse,
N. Y.

Roessing Mfg. Co., 1616 Noble St., Sharpsburg Sta., Pitts-

Roessing Mfg. Co., 1616 Noble St., Sharpsburg Sta., Pittsburgh.

Roller Bearing Co. of America, Trenton, N. J. Rolyan Corp., 2241 Indiana Ave., Chicago.
Rome Grader & Machinery Corp., Rome, N. Y. Rome-Turney Radiator Co., Canal St., Rome, N. Y. Roper Corp., Geo. D., Blackhawk Ave., Rockford, Ill. Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore. Rosedale Foundry & Machine Co., Columbus Ave., N. S., Pittsburgh, Pa.

Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Cal. Roto-Beam Division, Peerless of America, Inc., 3300 S. Indiana Ave., Chicago.

\*\*Round Oak Co., Dowagiac, Mich.
Roxalin Flexible Lacquer Co., Inc., 800 Magnolia Ave., Elizabeth, N. J.

Royal Air Conditioning Equipment, 1024 Westminster Ave., Alhambra, Cal.

Alhambra, Cal. Royal-Apex Mfg. Corp., 62 Schenectady Ave., Brooklyn,

Royal-Apex Mfg. Corp., 62 Schenectady Ave., Brookly. N. Y.
Royal Ventilator Co., 415 Locust St., Philadelphia, Pa.
Royersford Foundry & Machine Co., Royersford, Pa.
Ruberoid Co., The, 500 Fifth Ave., New York City.
Ruberoid Co., 74 McDowell St., Columbus, O.
Rudy Furnace Co., Dowagiac, Mich.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct, Salem, Mass.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.
Russell Electric Co., 342 W. Huron St., Chicago, Ill.
Russell Co., F. C., 6535 Euclid Ave., Cleveland.
Russell Mfg. Co., John M., Naugatuck, Conn.
Rutland Fire Clay Co. Curtis Ave., Rutland, Vt.

Rybolt Heater Co., Miller St., Ashland, O.
Ryerson & Son, Inc., Joseph T., 2558 W. 16th St., Chicago.

Ryniker Sheet Metal Works, Inc., 122-124 N. 25th St., Bill-

S

S K F Industries, Inc., Front St. & Erie Ave., Philadelphia. Saino Mfg. Co., Inc., F. L., 70 W. Colorado Ave., Memphis, Tenn.

St. Charles Mfg. Co., St. Charles, Ill.
St. Charles Mfg. Co., St. Charles, Ill.
St. Clair Foundry Corp., Beech & Wilson Sts., Centralia, Ill.
St. Louis Furnace Mfg. Co., 2901 Elliot Ave, St. Louis, Mo.
St. Louis Tool Co., 2319 N. 9th St., St. Louis.
St. Paul Corrugating Co., Wabasha & Water Sts., St. Paul,

Minn.

Minn.

Sall Mountain Co., 176 W. Adams St., Chicago, Ill.
Sallada Mfg. Co., 3816 Grand Ave., S., Minneapolis, Minn.
Sampsel Time Control, Inc., Spring Valley, Ill.
Samson Plaster Board Co., Crosby Bldg., Buffalo, N. Y.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Sanmyer Corporation, 1269 W. North Ave., Chicago.
Sandberg Sheet Metal Works, 500 N. E. Union Ave., Portland. Ora. land, Ore.

Sarco Co., Inc., 183 Madison Ave., New York City. Sauereisen Cements Co., 5118 Main St., Sharpsburg Station,

Sauereisen Cements Co., 5118 Main St., Sharpsburg Station, Pittsburgh, Pa.

Savage Co., W. J., 912 W. Clinch Ave., Knoxville, Tenn. Schaefer Brush Mfg. Co., 117 W. Walker St., Milwaukee. Schatz Mfg. Co., Fairview, Poughkeepsie, N. Y. Schatz Venetian Blinds, Los Angeles, Cal. Schecter Brothers Co., Front & Cumberland Sts., Philadelphia, Pa.

Schill Mfg. Co., Mansfield St., Crestline, O.

Schmieg Sheet Metal Works, 312-320 Piquette Ave., Detroit. Schneible Co., Claude B., 3951 Lawrence Ave., Chicago. Schoedinger Co., F. O., 322-358 Mt. Vernon Ave., Columbus, O.

Schoedinger Co., F. C., 322-358 Mt. Vernon Ave., Columbus, O. Schundler & Co., Inc., F. E., Insulation Div., 504 Railroad St., Joliet, Ill.
Schwab Safe Co., Lafayette, Ind.
Schwab Safe Co., Lafayette, Ind.
Schwatzer-Cummins Co., 1128 E. 10th St., Indianapolis, Ind. Scientific Instrument Co., 531-35 W. Larned St., Detroit. Scott Engineering Co., 23 N. Sixth St., Noblesville, Ind. Scott-Newcomb, Inc., 1929 Pine St., St. Louis, Mo.
Scotvill Mfg. Co., Morency-Van Buren Div., Prairie Ave., Sturgis, Mich.
Scully Steel Products Co., 1319 W. Wabansia, Chicago. Scalkote Corp., 40 S. Clinton St., Chicago, Ill.

Scalkote Corp., 40 S. Clinton St., Chicago, Ill.
Seamlex Co., 5-13 48th Ave., Long Island City, N. Y.
Season-Aire Corporation of America 20 Bartlett St., Detroit.
Security Stove & Mfg. Co., 1630 Oakland, Kansas City, Mo.
Self-Vulcanizing Rubber Co., Inc., 605 W. Washington Blvd.,
Chicago, Ill.

Security Stove & Mig. Co., 1630 Oakiand, Kansas City, Mo. Self-Vulcanizing Rubber Co., Inc., 605 W. Washington Blvd., Chicago, Ill.

Seneca Rock Wool Co., 501 E. Market St., Tiffin, Ohio.

Seneca Wire & Mig. Co., Fostoria, Ohio.

Sentry Mig. Co., N. E. Cor. 13th & Grace Sts., Omaha, Nebr. Servel, Inc., Electric Ref. & Air Cond. Div., 119 Morton Ave. Evansville, Ind.

Service Machine Co., 750-760 Broadway, Elizabeth, N. J. Service to Industry, Box 133, West Hartford, Conn. Shafer Bearing Corp., 35 E. Wacker Dr., Chicago.

Shamblen Furnace Parts Co., 231-39 First Ave., Pittsburgh. Shakeproof Lock Washer Co., 2501 N. Keeler Ave., Chicago. Shallcross Co., 48th & Grays Ferry Rd., Philadelphia. Sharon Steel Corp., Sharon. Ps.

Shedlov Oil Burners, Inc., 717 Third Ave., S. Minneapolis. Sheet Metal Products Co., 320 S. Commercial St., Peorla, Ill. Sheldon Slate Products Co., 1717 Third Ave., S. Minneapolis. Sheet Metal Products Co., 172 Commercial St., Peorla, Ill. Sheldon Slate Products Co., 172 Third Ave., N. W., Cleveland. Shreveport Engineering Co., Inc., Main St., Granville, N. Y. Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland. Shreveport Engineering Co., Inc., 1241 Dalzell St., Shreveport, La.

Sight Feed Generator Co., 14 N. Tenth St., Richmond, Ind. Signal Electric Mfg. Co., Menominee, Mich. Silent Glow Oil Burner Corp., 1477 Park St., Hartford, Conn.

Silent Glow Oil Burner Corp., 1477 Fark St., Hartford, Conn. Silent Sloux Oil Burner Corp., Orange City, Ia.

Simplex Manufacturing Co., 200 North Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 21 West St., New York City. Sinker-Davis Co., 230 S. Missouri St., Indianapolis, Ind. Sloux City Foundry and Boller Co., East 8th & Division Sts., Sloux City, Iowa.

Sloux City Foundry and Boiler Co., East 8th & Division Sts., Sloux City, Iowa.

Sisalkraft Co., The, 205 W. Wacker Dr., Chicago.

Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.

Skilsaw, Inc., 5033 Ellston Ave., Chicago, Ill.

Skinner Co., E. W., 402 Pearl St., Fitchburg, Mass.

Skinner Heating & Ventilating Co., Heater Div. of St. Louis Blow Pipe & Heater Co., Inc., 1954 N. 9th St., St. Louis.

St. Louis.

Skuttle Co., J. L., 999 Franklin St., Detroit, Mich. Sly Mfg. Co., W. W., 4736 Train Ave., Cleveland, O. Smidth & Co., F. L., 225 Broadway, New York City. Smith & Kanzler, Inc., 516 Lidgerwood Ave., Elizabeth, N. J. Smith, Inc.. Winfield H., Eaton St.. Springville, N. Y.

Smith, R. E., 1521 Garden Place, Waukegan, Ill. Smith Heater Co., Peter, 6209 Hamilton St., Detroit, Mich. Smith Welding Equipment Corp., 2619-33 Fourth St., S. E., Minneapolis, Minn.

Smooth-on Mfg. Co., 568-574 Communipaw Ave., Jersey City, N. J.
Snap-On Mfg. Co., 1023 Blue Island Ave., Chicago, Ill.
Snap-On Tools Corp., Kenosha, Wis.
Snead, Herbert S., 205 E. 42nd St., New York City.
Snoair Co., 1904 Field St., Dallas, Tex.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit, Mich.
Sonner Burner Co., 6th & Andrews, Winfield, Kan.
Soss Manufacturing Co., Roselle, N. J.
South Bend Air Products, Inc., 322 E. Colfax, South Bend,
Ind.

Southbridge Roofing Co., Inc., Hartwell & Chapin Sts., Southbridge, Mass. Southern Fan & Blower Co., 1305 S. Lamar St., Dallas, Tex. Southern Fan & Blower Co., 1805 S. Lamar St., Dallas, Tex. Southern States Iron Roofing Co., Stiles Ave., Savannah, Ga. Southworth Machine Co., 30 Warren Ave., Portland, Maine. Speedlaty Converters, Inc., East Braintree, Mass. Speedmaster Co., Des Plaines, Ill.

Speedway Mfg. Co., 1854 S. 52nd Ave., Cicero, Ill. Spencer Heater Division Aviation Mfg. Corp., 164 Park St., Williamsnort, Pa

Spencer Heater Division Aviation Mfg. Corp., 164 Park St., Williamsport, Pa.

Spencer Thermostat Co., 34 Forest St., Attleboro, Mass. Spencer Turbine Co., 484 New Park Ave., Hartford, Conn. Spoehrer-Lange Co., 3723 Commonwealth St., St. Louis. Spray Engineering Co., 103 Central St., Somerville, Mass. Spraying Systems Co., 4021F W. Lake St., Chicago, Ill. Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago, Ill. Spray Wheel Air Conditioners, Inc., 1320 19th St., Denver, Colo.

Spray Wheel Air Conditioners, Inc., 1320 19th St., Denver, Colo.

Sprout-Waldron & Co., Muncy, Pa.

Spun Steel Corp., 2037 Dueber Ave., S. W., Canton, O.

Square D Co., 6060 Rivard St., Detroit, Mich.

Stafford Co., N., 1st Ave. & 53rd St., Brooklyn, N. Y.

Standard Asbestos Mfg. Co., 820-22 W. Lake St., Chicago, Ill.

Standard Engineering Works, 289 Roosevelt Ave., Pawtucket, R. I.

Standard Fuel Engineering Co., 667 Post Ave., South, Detroit, Mich.

Standard Furnace & Supply Co., 407-13 S. 10th St., Omaha, Nebr.

Nebr.
Standard Galvanizing Co., 2619 W. Van Buren St., Chicago.
Standard Heating & Radiator Co., 704 Second Ave., Pitts-

Standard Heating & Radiator Co., burgh, Pa.

Standard Lime & Stone Co., 2004 First National Bank Bldg.,
Baltimore, Md.

Standard Pressed Steel Co., Jenkintown, Pa.

Standard Products Co., Fisher Building, Detroit.

Standard Rolling Mills, Inc., 143 Jewel St., Brooklyn, N. Y.

Standard Stamping & Perforating Co., 3137 W. 49th Pl.,
Chicago, Ill.

Standard Stamping & Perforating Co., 3137 W. 49th Pl., Chicago, Ill.

Standard Stoker Corporation, New Albany, Ind.

Stanley Electric Tool Div., The Stanley Works, Elm St., New Britain, Conn.

Stanley Mfg. Co., East Monument Ave., Dayton, O. Stanley Tools, New Britain, Conn.

Stanton Heater Co., Martins Ferry, O.

Star Electric Motor Co., 197 Grove St., Bloomfield, N. J. Star Expansion Bolt Co., 147 Cedar St., New York City.

Starr Piano Co., Richmond, Ind.

Staynew Filter Corp., 25 Leighton Ave., Rochester, N. Y. Steamaire Co., Dana Ave. & Newton St., Cincinnati, Ohio. Steel Products Engineering Co., Columbia St. at Dakota Ave., Springfield, O.

Steinhorst & Sons, Inc., Emil, 612 South St., Utica, N. Y. Stephens-Adamson Mfg. Co., Aurora, Ill.

Stephens Mfg. Co., 2507 E. 15th St., Tulsa, Okla.

Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles.

Angeles. Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles. Sterling Foundry Co., Sterling, Ill. Sterling Pump Corporation, Hamilton, Ohio. Ster-Na-Man Fdry. Co., 441 Williams St., Springfield, Ill. Stewart Foundry, O. S., 887 E. 67th St., Cleveland, O. Stewart Ice Machine Co., 1046 East 22nd St., Los Angeles. Stiglitz Furnace & Foundry Co., 2007-23 Portland Ave., Louisville Ky.

Louisville, Ky.
Stok-A-Fire Co., Inc., 6504 Olive Street Road, University
City, Mo.

City, Mo.
Stokerette Mfg. Co., 4540 Ravenswood Ave., Chicago, Ill.
Stokermatic Co., 1415 S. State St., Salt Lake City, Utah.
Stoker Products, Inc., 221 W. Prairie Ave., Decatur, Ill.
Stow Mfg. Co., 400 State St., Binghamton, N. Y.
Stover Mfg. & Engine Co., N. Henderson Ave., Freeport, Ill.
Strandwitz & Co., Inc., W. J., Jefferson and Master St.,
Camden, N. J.
Stratton & Terstegge Co., 15th & Main St., Louisville, Ky.
Streamaire Co., Cincinnati, O.
Stramline Pine & Fittings Div., Mueller Brass Co., Port

Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.

Structural Slate Co., Robinson Ave., Pen Argyl, Pa. Struthers Dunn, Inc., 1315 Cherry St., Philadelphia.

Sturtevant Co., B. F., Damon St., Hyde Park, Boston, Mass. Sturtevant Mill Co., Park & Clayton Sts., Dorchester, Bos-

ton, Mass. Sundstrand Engineering Co., 1327 Seventh St., Rockford, Ill.

Sun-Ray Oil Burner Corp., 114-02 Beach Channel Dr.,
Rockaway Park, N. Y.
Super Radiator Corp., 320 Plymouth Bldg., Minneapolis.

Superior Sheet Steel Co., The, Division of Continental Steel Corp., Canton & Louisville Rd., Canton, O. Superior Steel Corp., Grant Bldg., Pittsburgh, Pa. Supreme Air Filter Co., 126 W. 21st St., New York City.

Supreme Electric Products Corp., 99 Mt. Hope Ave., Rochester, N. Y.

Supreme Heater & Ventilating Corp., 1911 N. Market St., St. Louis, Mo. Sure Comfort Furnace Co., 1212 S. Elmwood Ave., Berwyn,

T11.

Surface Combustion Corp., 2375 Dorr St., Toledo, O. Susquehanna Engineering Co., Ninth & Iron Sts., Blooms-

Susquehanna Engineering Co., Ninth & Iron Sts., Bloomsburg, Pa.

Sutphen & Co., J. W., 150 S. LaBrea Ave., Los Angeles, Cal. Swaby Mfg. Co., 2335 W. Cermak Rd., Chicago, Ill. Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis, Mo. Swartwout Co., 18615 Euclid Ave., Cleveland, O. Swedish Venetian Blinds, 601 W. 26th St., New York City. Swift Corp., Carl E., 31 W. 8th St., Holland, Mich. Swift Mfg. Company, 247 McDougall Ave., Detroit, Mich. Swing-A-Way Steel Products, Inc., 1439 Merchandise Mart, Chicago. Chicago.

Syncro-Flame Burner Corp., 57 North St., Willimantic,

Syntron Co., 1938 Black St, Homer City, Pa. Syracuse Fire Door Corp., 900 Canal St., Syracuse, N. Y.

Taco Heaters, Inc., 342 Madison Ave., New York City.
Tagliabue Mfg. Co., C. J., Park & Nostrand Aves., Brooklyn.
Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.
Tannewitz Works, 315 Front Ave., N. W., Grand Rapids, Mich.

Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md.

Taylor Engineering Co., Metropole Hotel, Cincinnati.
Taylor-Hall Welding Corp., 99 Hope Ave., Worcester, Mass.
Taylor Instrument Companies, 95 Ames St., Rochester, N. Y.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., War-

ren, O.
Technical Coatings, Inc., 261 Water St., Brooklyn, N. Y.
Tecumseh Products Co., Tecumseh, Mich.
Telsit Insulation Co., 1933 West Farms Road, Bronx, N. Y.
Tem Products Co., Midland, Pa.

Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg.,
Birmingham, Ala.
Tenney Engineering, Inc., Bloomfield, N. J.
Tennessee Enamel Mfg. Co., Nashville, Tenn.
Tennessee Products Corp., American Natl. Bk. Bldg., Nashville, Tenn.

ville, Tenn.
Thatcher Furnace Company, 39 St. Francis St., Newark,

N. J.

Thermal Engineering Associates, 1618 Northshore Ave., Chicago.

Therminsul Corp., 1603 Fulford St., Kalamazoo, Mich.
Thermoid Rubber Div. of Thermoid Co., Whitehead Rd.,
Trenton, N. J.
Thompson & Company, Box 6757, Pittsburgh, Pa.
Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn,

Mass.
ThruBond Flashing Corp., 525 E. 136th St., New York City.
Tierney Rotor Ventilator Co., 239 4th Ave., S., Minneapolis.
Tiffin Art Metal Co., Broad & Second Ave., Tiffin, O.
Tilco-Fin, Inc., 58 Second Ave., Brooklyn, N. Y.
Timken Roller Bearing Co., Canton, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co.,
100 Clark Ave., Detroit, Mich.
Timm & Son, P. C., 2626 C St., Lincoln, Nebr.
Tinnerman Products, Inc., 2038-46 Fulton Road, Cleveland.
TiteFlex Metal Hose Co., 500 Frelinghuysen Ave., Newark,
N. J.
Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

N. J.

Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
Todd Combustion Equipment, Inc., Ft. of 23rd St., 601 W.
26th St., New York City.
Toledo Stoker Co., 48 Blucher St., Toledo, O.
Torchweld Equipment Div. National Cylinder Gas Co., 1035
W. Lake St., Chicago, Ill.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Townsend Co., New Brighton, Pa.
Trade-Wind Motor Fans, Inc., 1325 Maple Ave., Los Angeles.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit, Mich.
Triangle Manufacturing Co., Oshkosh, Wis.
Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.

Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.

Trindl, Inc., Jos. H., 2613 S. Michigan Blvd., Chicago.

Triplex Mfg. Co., Peru, Ind.

Triumph Ice Machine Co., 107 E. Front St., Cincinnati, O. Tropic-Air Stoker Co., New London, Ohio.

Tropical Paint & Oil Co., 1244-86 W. 70th St., Cleveland, O. Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn. Trufio Fan Co., 523 Main St., Harmony, Pa.

Truscon Laboratories, Caniff & Grand Trunk R. R., Detroit. Truscon Steel Co., Albert St., Youngstown, O. Tubular Rivet & Stud Co., Wollaston, Mass.

Turner & Seymour Mfg. Co., Lawton St., Torrington, Conn. Turner Brass Works, \$23 Park Ave., Sycamore, Ill..

Tuttle Air Filter Co., Inc., 1014 W. Main St., Louisville, Ky.

\*Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.

\*Twentieth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

Uehling Instrument Co., 473 Getty Ave., Paterson, N. J. Una Welding, Inc., 1615 Coliamer Ave., Cleveland, O. Unified Air Conditioner Co., 322 W. Michigan St., Duluth, Minn

Uniflow Mfg. Co., East Lake Road, Erie, Pa.
U-Ni-Matic Heating Systems, Inc., 1303 W. Slauson Ave.,
Los Angeles, Cal.

Union Manufacturing Co., Inc., 6th & Washington Sts., Boyertown, Pa. Union Rock Wool Corp., 210 Chestnut St., Wabash, Ind.

Union Steam Pump Co., S. W. Capital Avenue, Battle Creek, Mich.

United American Bosch Corp., 3664 Main St., Springfield, United Cork Companies, Central Ave. & N. J. Central R. R.,

Kearny, N. J. United Electric Controls Co., 69 "A" St., South Boston. United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City, N. Y.

United Metal Prod. Div., Canton, Ohio.

United Motors Service, Detroit, Mich.

•U. S. Air Conditioning Corp., 2101 Kennedy St., N. E., Min-

neapolis, Minn. United States Brass & Copper Co., Hyde Park Ave., Hyde Park. Mass.

United States Burner Corp., Hartford, Conn. U. S. Cistern Filter Mfg. Co., The, 509 S. McClun St., Bloomington, Ill.

U. S. Expansion Bolt Co., Inc., P. O. Box 827, York, Pa. U. S. Electrical Motors, Inc., 200 E. Slausson Ave., Los Angeles.

United States Electrical Tool Co., 2482 W. 6th St., Cincinnati. O.

United States Gypsum Co., 300 W. Adams St., Chicago, Ill. •U. S. Machine Corporation, Lebanon, Ind.

United States Mineral Wool Co., 9 S. Clinton St., Chicago. United States Ozone Co. of America, Crescent St., Scottdale, Pa.

United States Radiator Corp., 1056 National Bank Bldg., Detroit, Mich.

 United States Register Co., Burnham St., Battle Creek, Mich.
 U. S. Rock Wool Co., 40 S. Main, Salt Lake City.
 United States Rubber Co., 1790 Broadway, New York City.
 United States Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.
 Uni-Therm Products Co., P. O. Box 83, Elyria, O.
 Universal Air Filter Corp., 332 W. Michigan St., Duluth, Minn. Universal Blower Co., 124 S. Woodward Ave., Birmingham,

Universal Cooler Corp., Marion, Ohio. Universal Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 105 W. Madison St., Chicago.
Universal Utilities, P. O. Box 127. Crestline, O.
Universal Power Corporation, 4300 Euclid, Cleveland.
Universal Zonolite Insulation Co., 135 S. LaSalle St., Chicago.

Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass. Upson Co., The, Upson Point, Lockport, N. Y. Utica Radiator Corp., 2201 Dwyer Ave., Utica, N. Y. eUtility Fan Corporation, 4851 S. Alameda St., Los Angeles.

Vacuum Gas Appliance Div., Union Fork & Hoe Co., Rome, N. Y.
Vacuum Gas Burner Corp., 115 N. Union St., Olean, N. Y.
Vail Mfg. Co., 1017 Columbia Ave., Fort Wayne, Ind.
Valley Mfg. Co., Fryeville, Athol, Mass.
Van Dorn Electric Tool Co., Towson, Md.
Van Noorden Co., E., 100 Magazine St., Boston, Mass.
Vendor Slate Co., Inc., P. O. Box 204, Nazareth, Pa.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago.
Vent-O-Lite Co., 4230 W. Taylor St., Chicago, Ill.
Vermont Structural Slate Co., Fair Haven, Vermont.

•Verson Allsteel Press Co., 1351 E. 93rd St., Chicago.
Vibration Eliminator Co., 8-22 Astoria Blvd., Astorla, N. Y.

•Victor Electric Products, Inc., 2950 Robertson Road, Cin-

Victor Electric Products, Inc., 2950 Robertson Road, Cincinnati, Ohio.
 Victor Equipment Co., Kimball-Krogh Pump Div., 1010 E.

62nd St., Los Angeles, Cal.
Victor Oil Burner Mfg. Co., 250 Pleasant St., Hartford, Conn.

Vigor-Aire Corp., 127 S. 5th St., Philadelphia.

•Viking Air Conditioning Corp., 9500 Richmond Ave., Cleveland, O.

Viking Mfg. Corp., 12600 Greenfield Rd., Detroit. Viking Pump Co., 404 State St., Cedar Falls, Ia.
Viking Shear Co., 1063 19th St., Erie, Pa.
Vilter Mfg. Co., 2217 S. First St., Milwaukee, Wis.
Volcano Burner Corp., 3612 E. Tremont Ave., New York

Vortex Mfg. Co., 687 N. Tillamook St., Portland, Ore. Vulcan Electric Co., Lynn, Mass.

Wagner, C. DeWitt, 1000 2nd St., S. E., Cedar Rapids, Ia. Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo. Walles Dove-Hermiston Corp., Westfield, N. J. Waldron Corp., John, New Brunswick, N. J.

• Walker Mfg. & Sales Corp., 1711-1717 Penn St., St. Joseph,

Walker and Eder, Inc., 37 W. 39th St., New York City, Walsh Refractories Corp., 4070 N. First St., St. Louis. Walworth Co., 60 E. 42nd St., New York City. Ward Co., Edgar T., Inc., 7777 W. Lake St., River Forest,

111.

Ward Co., H. H., Chester, Pa. Ward Heater Co., Ltd., 1800 W. Washington Blvd., Los Angeles, Cal.

Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.

Ward Machinery Co., 564 W. Washington Blvd., Chicago. Ward Machinery Co., 564 W. Washington Bivd., Chicago. Ward Mfg. Co., 107-11 E. Milwaukee Ave., Detroit, Mich. Warren Shade Co., Inc., 2905 E. Hennepin Ave., Minneapolis. Washburne & Co., E. G., 207 Fulton St., New York City. Washington Stove Works, 3402-22 Smith Ave., Everett,

Waterloo Register Co., 2520 E. Fourth St., Waterloo, Ia.
 Waterman-Waterbury Co., 1122 Jackson St., N. E. Minneapolis, Minn.

Wattenamel Co., 7400 Archer Ave., Summit, Ill. Waukesha Lime & Stone Co., Waukesha, Wis. Waverly Heating Supply Co., 31 Union St., Boston, Mass. Wayne Automatic Relay Co., 622 Wagner St., Fort Wayne,

Wayne Oil Burner Corp., 800 Glasgow Ave., Fort Wayne,

Wayne Pattern & Foundry Co., 236 Murray St., Fort Wayne, Ind.

Wayne, Ind.
Weatherhead Co., 300 E. 131st St., Cleveland, O.
Webster Engineering Co., 419 W. 2nd St., Tulsa, Okla.
Weaver Mfg. Co., Springfield, Ill.
Webster & Co., Warren, 17th & Federal St., Camden, N. J.
•Weil Pump Co., 290 Spruce St., Chicago, Ill.
Weinman Pump Co., 290 Spruce St., Columbus, O.
Weirton Steel Co., Weirton, W. Va.
•Weiss & Co., H., 113-115 Mercer St., New York City.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 341 N. Pulaski Rd., Chicago, Ill.
Wells Mfg. Corp., 315 Seventh Ave., Three Rivers, Mich.
Western Blower Co., 1800 Airport Way, Seattle, Wash.
Western Engineering & Mfg. Co., 1726 E. Washington
Blvd., Los Angeles.

Western Engineering & Mrg. Co., 1726 E. Washington Blvd, Los Angeles.

Western Felt Works, 4027 Ogden Ave., Chicago, Ill. Western Furnaces, Inc., 950 Commerce St., Tacoma, Wash. Western Rock Wool Corp., Huntington, Ind.

Western Precipitation Corp., 1016 W. 9th St., Los Angeles. Western Mineral Products Co., Omaha, Nebr.

Western Silicair Products, Inc., 72 S. Alameda Ave., Burbank, Cal.

Western Venetian Blind Co., 601 W. 26th St., New York City. Western Wire & Iron Works, Inc., 945 W. 18th Pl., Chicago.

Western Wire & Iron Works, Inc., 945 W. 18th Pl., Chicago. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., East Springfield, Mass., and Cleveland. Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark, N. J.

Westwick & Son, Inc., John, Claude & Meeker Sts., Galena, Wheelco Instruments Co., 1933 S. Halsted St., Chicago, Ill.

Wheeling Corrugating Co., 1938 S. Halsted St., Chicago, 111.
Wheeling Corrugating Co., Wheeling Steel Bldg., Wheeling, W. Va.
Wheeling Furnace Corporation, Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Moundsville, W. Va.
Wheeling Steel Corp., Wheeling Steel Bldg., Wheeling,

Wheeling Steel Corp., Wheeling Steel Edg., Wheeling W. Va.
White & Company, Haydn F., 1740 E. 12th St., Cleveland.
White Mfg. Co., 2362 University Ave., St. Paul, Minn.
White-Rodgers Electric Co., 1209 Cass Ave., St. Louis, Mo.
Whiting Corp., Harvey, Ill.
Whitney Chain & Mfg. Co., Bartholomew Ave., Hartford,

Conn.

Conn.

Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.

Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill.

Wickwire Spencer Steel Co., 500 Flifth Ave., New York City.

Wiedemann Machine Co., 1815 Sedgley Ave., Philadelphia.

Wilder Mfg. Co., P. O. Box 189, Niles, O.

Wilhelm Co., A., 3rd & Bern Sts., Reading, Pa.

Will-Burt Co., Orrville, O.

Williams Oil-O-Matic Heating Corp., 1201 E. Bell, Bloomington, Ill.

williams Oil-O-Matic Heating Corp., 1201 E. Dan, 2001, ington, Ill.
Williams-Wallace Co., 160 Hooper St., San Francisco.
Williamson Heater Co., 337 W. Fifth St., Cincinnati, O.
Willis Mfg. Co., Inc., 156 N. Academy St., Galesburg, Ill.
Will-Weld Mfg. Co., Inc., 600-620 S. 15th St., Omaha, Nebr.
Willy's Carbide Tool Company, 1340 W. Vernor Highway, Detroit

Wilson Building Materials Co., 2716 Eugenie Lane, Cincinnati. Ohio.

Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago, Ill. Wilson Co., The H. A., 105 Chestnut St., Newark, N. J. Wilson, Inc., Grant, 4101 W. Taylor St., Chicago, Ill.

Advertisement in this issue. See Index to Advertisers, page 804

Wilson Products, Inc., 343 Thorn St., Reading, Pa. Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

Wing Mfg. Co., L. J., 154 W. 14th St., New York City. Wisconsin Heating & Draft Control Co., 156 Lake Drive, Oshkosh, Wis.

Mass.

n

ry. st d.

18. m.

ng. nd. Mo.

ity.

m-

111. br. ay, in-

141

Wise Furnace Co., 101 Lincoln St., Akron, O.
 Wise & Sons Co., J., 33 Littleton Ave., Newark, N. J.
 Wittenmeier Machinery Co., 850 N. Spaulding Ave., Chicago, Ill.

• Wodack Electric Tool Corp., 4644 W. Huron St., Chicago. Wolverine Tube Co., 1419 Central Ave., Detroit, Mich. Wood Conversion Co., First National Bank Bidg., St. Paul, Minn.

Wood Industries, Inc., Gar, 7924 Riopelle St., Detroit, Mich. Wood Steel Co., Alan, Conshohocken, Pa. Woodhill Chemical Co., 3708 E. 93rd St., Cleveland.

Woodhill Chemical Co., 3708 E. 93rd St., Cleveland.
Woods-Evertz Stove Co., Springfield, Mo.
Wood's Sons Co., T. B., Fifth Ave., Chambersburg, Pa.
Woolery Machine Co., 2919 Como Ave., S. E., Minneapolis.
Woolwine Metal Products Co., Atlantic Blvd. & S. Riverside
Dr., Los Angeles, Cal.
Wooster Art Wood, Inc., P. O. Box 198, Wooster, O.
Worcester Brush & Scraper Co., Div. Mason Worcester Co.,
38 Austin St., Worcester, Mass.
Worcester Pressed Steel Co., 99 Barber Ave., Worcester,
Mass.

Worthington Pump & Machinery Corp., Carbondale Div.. Harrison, N. J.

XL Refrigerating Co., Inc., 1834 W. 59th St., Chicago, Ill. X-Pando Corp., 43-15 36th St., Long Island City, N. Y. •XXth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

## Y

Yardley Venetian Blind Co., 138 Parsons Ave., Columbus, Ohio. Ohio.

Yarnall-Waring Company, Chestnut Hill, Philadelphia, Pa. Yates-American Machine Co., Beloit, Wis.

Yeomans Bros. Co., 1433 Dayton St., Chicago, Ill.

Yoder Co., 5500 Walworth Ave., Cleveland, O.

York Corrugating Co., Adams St. & WM RR., York, Pa.

York Ice Machinery Corp., Roosevelt Ave., York, Pa.

York Oil Burner Co., Inc., Jessop Place & P. R. R., York, Pa.

Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati, O.

Young Radiator Co., 709 Marquette St., Racine, Wis.

Young Regulator Co., 4500 Euclid Ave., Cleveland, O.

eYoungstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

Zapon-Brevolite Div. Atlas Powder Co., North Chicago, Ill. Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.
Zenith Electric Company, 607 S. Dearborn St., Chicago, Ill.
eZink Co., John, 4401 S. Peoria St., Tulsa, Okla.
Zobell Electric Motor Corp., Garwood, N. J.

# Index to ADVERTISERS

A-C Mfg. Co223
A-C Mfg. Co
Adams Co., The
Advance Appliance Co 55
Air Controls, Inc
Air Control Products, Inc
Air-Maze Corp
Airtemp Div., Chrysler Corp 57
Alco Mfg. Co222
Aldrich Co
Allen Corp
Allen Corp
American Brass Co
American Foundry & Furnace Co218 American Metal Products Co222
American Radiator & Standard
Sanitary Corp 49
American Rolling Mill Co., The 45
A. S. H. & V. E
Apollo Metal Works220 Armstrong Co., The215
Atcheson Glass Co., T. J
Auer Register Co100
Automatic Humidifier Co109
Automatic Products Co158
Barber Gas Burner Co., The 50
Bead Chain Mfg. Co 70
Beck Engineering Combustion Co178 Benson Co., Inc., Alex R223
Berger Bros. Co209
Bethlehem Steel Co
Binkley Mfg. Co189
Bishop & Babcock Mfg. Co203
Brauer Supply Co., A. G
Bremil Mfg. Co
Capitol Furnace & Stove Repair Co211
Carnegie-Illinois Steel Corp 10
Carnegie-minors Steel Corp 10
Central Die Casting & Mfg. Co208
Central Die Casting & Mfg. Co208 Central Furnace & Stove Repair Co215
Central Die Casting & Mfg. Co208 Central Furnace & Stove Repair Co215 Central-West Machinery Co23
Central Die Casting & Mfg. Co208 Central Furnace & Stove Repair Co215 Central-West Machinery Co223 Century Electric Co22
Central Die Casting & Mfg. Co
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.       200         Clarage Fan Co.       128         Climatemaker Slide Rule Service.       220         Conco Corp.       209
Central Die Casting & Mfg. Co
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.       200         Clarage Fan Co.       128         Climatemaker Slide Rule Service.       220         Conco Corp.       209         Conco Engineering Works.       220         Condensation Engineering Corp.       221
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.       200         Clarage Fan Co.       128         Climatemaker Slide Rule Service.       220         Conco Corp.       209         Conce Engineering Works.       220         Condensation Engineering Corp.       221         Cole Hot Blast Mfg. Co.       196
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.200       Clarage Fan Co.         Clarage Fan Co.       128         Climatemaker Slide Rule Service       220         Conco Corp.       209         Conco Engineering Works       220         Condensation Engineering Corp.       221         Cole Hot Blast Mfg. Co.       196         Cole-Sullivan Engrg. Co.       222
Central Die Casting & Mfg. Co
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.200       Clarage Fan Co.         Clarage Fan Co.       128         Climatemaker Slide Rule Service       220         Conco Corp.       209         Conco Engineering Works       220         Condensation Engineering Corp.       221         Cole Hot Blast Mfg. Co.       196         Cole-Sullivan Engrg. Co.       222
Central Die Casting & Mfg. Co.       208         Central Furnace & Stove Repair Co.       215         Central-West Machinery Co.       223         Century Electric Co.       22         Chace Co., W. M.       200         Champion Tool Co.       223         Chandler Co.       194         Cincinnati Sheet Metal & Roofing Co.200       128         Clarage Fan Co.       128         Climatemaker Slide Rule Service       220         Conco Corp.       209         Conco Engineering Works       220         Condensation Engineering Corp.       221         Cole Hot Blast Mfg. Co.       196         Cole-Sullivan Engrg. Co.       222         Commercial Shearing & Stamping Co.       61         Controlair, Inc.       201         Grescent Tool Co.       25
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conce Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Sullivan Engrg.         Co.         196           Cole-Sullivan Engrg.         Co.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         221
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conce Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         32           Detroit Lubricator Co.         32
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conco Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Hot Blast Mfg. Co.         196           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         32           Doyle Vacuum Cleaner Co.         213
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.200         128           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conco Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201         25           Delco Products Corp.         59           Deniston Co.         221           Deviev Vacuum Cleaner Co.         213           Dreis & Krump Mfg.         20.         72
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conco Engineering Works.         220           Condensation Engineering Corp.         221           Cole Hot Blast Mfg. Co.         196           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201         25           Delco Products Corp.         59           Deniston Co.         221           Detroit Lubricator Co.         32           Doyle Vacuum Cleaner Co.         213           Dreis & Krump Mfg. Co.         72           Dwyer Mfg. Co., F. W.         223
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conco Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         221           Detroit Lubricator Co.         32           Doyle Vacuum Cleaner Co.         213           Dreis & Krump Mfg.         72           Dwyer Mfg.         20.           Eisler Engineering Co.         223
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co.         W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conce Engineering Works.         220           Condensation Engineering Corp.         221           Cole Hot Blast Mfg. Co.         196           Cole-Sullivan Engrg.         20.           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         221           Detroit Lubricator Co.         32           Doyle Vacuum Cleaner Co.         213           Dreis & Krump Mfg. Co.         72           Eisler Engineering Co.         223           Eligo Shutter & Mfg. Co.         197
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co., W. M.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Conco Engineering Works.         220           Condensation Engineering Corp.         221           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         221           Detroit Lubricator Co.         32           Doyle Vacuum Cleaner Co.         213           Dreis & Krump Mfg.         72           Dwyer Mfg.         20.           Eisler Engineering Co.         223
Central Die Casting & Mfg. Co.         208           Central Furnace & Stove Repair Co.         215           Central-West Machinery Co.         223           Central-West Machinery Co.         223           Century Electric Co.         22           Chace Co.         200           Champion Tool Co.         223           Chandler Co.         194           Cincinnati Sheet Metal & Roofing Co.         200           Clarage Fan Co.         128           Climatemaker Slide Rule Service.         220           Conco Corp.         209           Condeo Engineering Works.         220           Condeo Engineering Works.         220           Condeo Engineering Works.         220           Condeo Engineering Works.         220           Cole Hot Blast Mfg. Co.         196           Cole-Sullivan Engrg.         20.         222           Commercial Shearing & Stamping Co.         61           Controlair, Inc.         201           Crescent Tool Co.         25           Delco Products Corp.         59           Deniston Co.         221           Detroit Lubricator Co.         32           Doyle Vacuum Cleaner Co.         213           D

Fluid Heat Div., Anchor Post Fence
Co.         65           Frederick Iron & Steel Co.         202           Frey Co., Frank P.         223           Front Rank Furnace Co.         176
G & O Mfg. Co       212         General Blower Co.       223         General Controls       147         Gerett Corp., M. A       198         Gillen Co., J. L       99         Gray Metal Products, Inc.       40
Hall-Neal Furnace Co
Hess Warming & Ventilating Co203 Homer Furnace & Foundry Corp63 Hotel Claridge219 Hussey & Co., C. G30
Illinois Testing Lab., Inc.       216         Independent Register Co., The       47         International Heater Co.       190         International Nickel Co., Inc.       5         Interstate Machinery Co.       223
Johnson Gas Appliance Co212
Kent Co., Inc.       218         Kidder Mfg. Co., Inc., S. F.       214         Klauer Manufacturing Co.       203         Klenk, Karl       214
Lamneck Products, Inc
Inside Front Cover
McDonnell & Miller         9           Maid-O'-Mist, Inc.         224           Majestic Co.         60           Marsh Lumber Co., Inc.         204           Marshalltown Mfg. Co.         212           Mauer Engineering         222           Maurey Mfg. Co.         34           May-Fiebeger Co.         207           Mercoid Corp., The. Inside Back Cover         207           Meyer & Bro. Co., F.         11 and 14           Meyer Furnace Co.         12 and 13           Michigan Tank & Furnace Co. 18 and 19         Milcor Steel Co.           Milcor Steel Co.         29           Monmouth Products Co.         28           Morency-Van Buren Div., Scovill Mfg.         20           Co.         177           Mt. Vernon Furnace & Mfg. Co.         58
Mueller Furnace Co., L. J26 and 27
National Super Service Co
Osborn Co., J. M. & L. A 35
Pacific Gas Radiator Co

	-	•
Patent Novelty Co	199 157 191 53 217 127	7
Randall Graphite Products Corp Register & Grille Mfg. Co Republic Steel Corp Research Products Corp Riester & Thesmacher Co Robertson, F. L Rock Island Register Co Rockford Brass Works Round Oak Co Ruby Chemical Co Rybolt Heater Co	66 82 184 22: 22: 21: 22: 7: 21: 2: 16:	5 2 4 3 3 1 8 1 5
St. Louis Furnace & Mfg. Co	7	6
Sall Mountain Co	186	2
Sampsel Time Control, Inc	21	4
Scovill Mfg. Co	18	5
Scully Steel Products Co	21	2
Skuttle Sales Co	210	ĺ
Speedway Mfg. Co	22	200
Speedway Mfg. Co Standard Stamping & Perforating Co. Stanley Elec. Tool Div., The Stanley Works Sturtevant Co., B. F Superior Sheet Steel Co	.19	
Works	3	ě
Sturtevant Co., B. F	21	9
Surface Combustion Corp	. 0	ā
Swartwout Co		
Thermal Engineering Associates Triangle Mfg. Co	20	]
Tuttle & Bailey, Inc	7	
U. S. Air Conditioning Corp	. 5	2
U. S. Air Conditioning Corp U. S. Machine Corp U. S. Register Co	1 1	3
U. S. Steel Corp	1	(
Verson Allsteel Press Co Victor Electric Products, Inc	19	A
Viking Air Conditioning Corp	4	1
Walker Manufacturing & Sales Corp.	20	4
Ward Machinery Co Waterloo Register Co	5	4
Waterloo Register Co	11	
Weil Pump Co	21	•
White Mfg. Co	.21	
White-Rodgers Electric Co	. 20	
Whiting Corp. Whitney Mfg. Co., W. A	.18	
Whitney Metal Tool CoWilliamson Heater Co	.21	
Willis Mfg. Co	.22	ŀ
Wilson, Inc., Grant	. 3	
Wise Furnace Co Wiss & Sons Co., J Wodack Elee. Tool Corp	. 8	
XXth Century Htg. & Ventilating Co.		
Youngstown Sheet & Tube Co		
Zink Co., John		
ESTATE LIVE JULIES	. 40	4



# HERE'S A RESOLUTION YOU'LL NOT BREAK



8 1 5

)1 )5 

Mercoid Sensatherm
he thermostat that aswes even room temerature control under
il kinds of weather
onditions. Neat in ap-



Mercoid JMI Safety and Ignition Control iters positive protecan against oil burner ime or ignition failure. he trade's most popu-

centrol

The passing of the old year is an opportune time for reflection. It marks an important mile-post, where we stop to review the affairs of the year, take inventories and make plans for another year. \( \psi \) If you have not been a regular user of Mercoid Controls—Resolve to Make This a Mercoid Year. You will find it a worthwhile resolution, working along the line of least resistance by creating customer satisfaction, and eliminating encroachment on your profits through unnecessary service expense. \( \psi \) Mercoid Controls are basically correct in design, construction and operation. They represent the best in engineering skill and production. \( \psi \) All Mercoid Controls are equipped exclusively with sealed mercury contact switches, eliminating contact trouble and assuring long life. \( \psi \) There is a Mercoid Control for every type of requirement. Consult catalog for complete information.



Mercoid Fan and Limit Control

Protects furnace from overheating and operates the fan only when furnace has heat to deliver.



Mercoid "Heat Motor" Stoker Fire Maintaining Control

A very reliable control. Easy to adjust for all operating conditions.

